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V O L. VII.

ETM—GOA

INDOCTI DISCANT, ET AMEN MEMINISSE PERITI.

P H I L A D E L P H I A :

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ANALYTICAL
DICTIONARY
OF
ARTS, SCIENCES,
AND
GENERAL LITERATURE;
CONTAINING
THE HISTORY OF THE ARTS AND SCIENCES
AND THE HISTORY OF LITERATURE
FROM THE EARLIEST TO THE PRESENT
TIMES
IN TWO VOLUMES
BY
JAMES HANCOCK, ESQ.
OF THE MIDDLE TEMPLE



ENCYCLOPÆDIA.

E T M

Ethiops
Etmuller.

ETHIOPS ANTIMONIAL, MARTIAL, and MINERAL. See PHARMACY-Index.

ETHMOIDES, in anatomy, a bone situated in the middle of the basis of the forehead or os frontis and at the top of the root of the nose, filling almost the whole cavity of the nostrils. It has its name from *ἔθμος cribrum*, "sieve," and *εἶδος* "form," because all spongy and porous. See ANATOMY, n° 17.

ETHNARCHA, **ETHNARCH**, (formed of *ἔθνος* nation, and *αρχή* command), a governor or ruler of a nation.

There are some medals of Herod I. surnamed the Great, on one side whereof is found *Ἡρώδης*, and on the other *Εθναρχου*, q. d. *Herod the Ethnarch*. After the battle of Philippi, we read that Antony passing over into Syria, constituted Herod and Phasael his brother tetrarchs, and in that quality committed to them the administration of the affairs of Judea (Jof. Ant. lib. xiv. cap. 23.) Herod therefore had the government of the province before ever the Parthians entered Syria, or before Antigonus's invasion, which did not happen till six or seven years after Herod was commander in Galilee. (Jof. lib. xiv. cap. 24, 25.) Consequently Herod was then truly ethnarch, for he can be no otherwise denominated; so that it must have been in that space of time that the medals were struck, which only give him this title: which medals are a confirmation of what we read in history of the government which that prince was intrusted with before he was raised to the royalty.

Josephus gives Herod the appellation of *tetrarch* in lieu of that of *ethnarch*; but the two terms come so near to each other, that it is easy to confound them together.

Though Herod the Great left by will to Archelaus all Judea, Samaria, and Idumea, yet Josephus tells us he was then only called *ethnarch*.

ETHNOPHRONES, in antiquity, a sect of heretics in the seventh century, who made a profession of Christianity, but joined thereto all the ceremonies and follies of paganism, as judicial astrology, sortileges, auguries, and other divinations.

ETIQUETTE, a French term, primarily denoting a ticket or title affixed to a bag or bundle of papers, expressing its contents. It is also used, when applied to the Spanish and some other courts, to signify a particular account of what is to be done daily in the king's household, and in the chief ceremonies relating to it. It likewise denotes those forms that regulate the decorum of conduct towards persons of various ranks and stations.

ETMULLER (Michael), a most eminent physician.

VOL. VII.

E T N

cian, born at Leipzig in 1646. After having travelled through the greatest part of Europe, he became professor of botany, chemistry, and anatomy, at Leipzig; where he died in 1683. He was a very voluminous writer; his works making no less than 5 vols folio, as printed at Naples in 1728. His son Michael Ernest Etmuller was also an ingenious physician, who published several pieces, and died in 1732.

ETNA, or **ÆTNA**, a famous burning mountain of Sicily, and the largest in Europe; of which an account has been already given under the latter spelling **ÆTNA**. The following additional particulars relating to the eruptions, size, scenery, and products, of this celebrated volcano, are collected from the *Voyage Pittoresque* of M. Houel, who appears to have surveyed it with greater accuracy than any former traveller.

The form of mount Etna is that of a cone, very broad at the base, which is more than 40 miles in circumference. From the bottom you ascend ten leagues before reaching its summit on the south side; and on any of the other sides, the way being not so straight, would be considerably longer. Etna is entirely composed of substances that have been discharged from the volcano in its various explosions.

It appears from the quantities of marine bodies deposited all over the under part of Etna, that it must have been once covered by the sea to at least one half of its present height. The whole island of Sicily, and the greatest part of mount Etna, have been, in our author's opinion, formed under water. But the period when the eruptions from this volcano first commenced, the manner in which the sea subsided, and the precise time at which it fell so low as its present level on the shores of Sicily, are facts concerning of which we have no certain knowledge.

The general principle, however, M. Houel thinks may be regarded as undeniable. When this mountain stood half under water, the currents of the ocean would gradually accumulate upon it large masses, both of its own productions, such as shells, and bones of fishes, and of various other matters, which would be intermixed with the volcanic matters discharged from the focus of the burning mount. In a long series of ages these strata of heterogeneous matters would naturally become so considerable as to form the enormous mass of mountains with which the volcano is now surrounded. The currents of the ocean might often convey the volcanic matters to a considerable distance from the volcanic focus. And there are mountains at no small distance from Etna, which seem to have been produced in this manner. Those of Carlintini, at the distance of 15 leagues, consist chiefly

A

of

Etna.

Houel's observations.

Etna.

of a mixture of pozzolana, with calcareous matters. At Lintini, and in places around it, there are distinct beds of pozzolana, scoriae, and real lava, as well as others in which all these matters are blended together in a mass of calcareous matter. At Palazzolo, about 24 miles from the city of Syracuse, the sides of the hills having been cut by the streams which run down them, in many places to a considerable depth, display huge masses of lava, and extensive beds of pozzolana. In the neighbourhood of Noto there are also volcanic productions to be found.

At Pachino, where the island of Sicily forms an angle, there are a range of hills extending for several miles, which consist of pozzolana.

The province of Val de Noto is more homogeneous in the matters of which its soil consists, than the two other dales of Sicily. These, in every hill which they contain, exhibit a variety of different matters. So amazing, indeed, is that variety, that they may be considered as exhibiting a collection of specimens of all the different materials which enter into the composition of the globe. In those two dales few volcanic productions have been yet observed. But it is not to be inferred for this reason, that they contain but few. They may be hereafter discovered in great plenty. In the volcano of water at Maccalubbe, between Aragona and Girginti; in the baths of Castellamare, near Alcamo and Segeste; in the baths of Termini, in the isles of Lipari; in the hot waters of Ali, between Messina and Taormina, by the lake in the valley of Caltagirone; in all these places which comprehend the whole circumference of Sicily, the influence of the volcano of Etna is, in some measure, felt. Nay, it would even seem, that in these places there are so many volcanic craters. All of these are so disposed as to show that they existed prior not only to the volcanic matters, but to the other substances intermixed with them.

The waters of the sea have, in former times, risen much higher than at present. But how they retreated, or whether they are to continue stationary at their present height, we know not. For more than 2000 years, during which Sicily has been inhabited, and has had cities and harbours, the sea has not been observed either to recede or encroach in any considerable degree.

When the sea subsided from mount Etna, the mountain must have been covered over with such matter as the sea usually deposits; consequently with calcareous matters. A part of those matters would be indurated by the action of the atmosphere, while the rest would be carried down by the rain-waters, and again conveyed into the ocean. The torrents of rain-water which pour down the sides of mount Etna have furrowed its sides, by cutting out for themselves channels; and they have removed from its summit, and are still removing, to a farther distance, all the extraneous bodies upon it. In many places they flow at present over a channel of lava, having cut through all the matters which lay above it: still, however, there remain in many places both calcareous matter and other marine productions, which show that this volcano has been once covered by the waters of the ocean. But these are daily wasting away; not only the rains, but

men likewise, who carry them off as materials for lime and for building, conspire to deface them.

No fewer than 77 cities, towns, and villages, are scattered over the sides of Etna. They are most numerous on the south side, where the temperature of the air is milder than on the north. Reckoning those cities, towns, and villages, one with another, to contain each 1200 or 1500 souls, the whole number of the inhabitants of mount Etna will then be 92,400, or 115,500. But it is certainly much more considerable.

On plate CLXXXIV. is exhibited a view of the north-east side of the mountain, taken at sea. The lower part presents to the eye very extensive plains entirely covered with lava of different thickness, on which vegetation has not yet made any progress. The nearer the shore the more barren is the ground; while the fertility of the soil increases as we advance farther inwards. The mountain is every where full of vast excavations; which our author considers as a proof, that instead of increasing in bulk, it is actually in a state of decay and diminution. The vast torrents of lava which overspread the sides of it from time to time, he considers as insufficient to repair the waste occasioned by rains, rivulets, and torrents flowing down from the summit. Unless the eruptions, therefore, become more frequent than they have been for some time past, he supposes that, by degrees, the height of the mountain must be reduced to that of the surrounding beds of lava. He had not an opportunity of measuring the altitude of Etna himself; but he observes that it had been done by the celebrated M. de Saussure, who found the elevation to be 10,036 feet. This was done on the 5th of June 1773, at 20 minutes after seven in the morning. The height of the barometer on the most elevated part at the brink of the crater was 18 inches $11\frac{1}{2}$ lines; which, by the necessary corrections, is reduced to 18 inches $10\frac{1}{2}$ lines. At the same time the mercury at Catania, placed only one foot above the level of the sea, stood at 28 inches $2\frac{1}{2}$ lines; which must be reduced to 28 inches $1\frac{1}{2}$ lines, on account of the necessary corrections for the thermometer.

From Giana our author had an opportunity of contemplating the vast number of calcareous mounds scattered over that part of Etna; which (he says) "are nothing more than fragments, the slender remains of those enormous masses which have been deposited all around the base of mount Etna; and are a very curious monument of the revolutions which this mountain has undergone." They are of a true calcareous nature; and the inhabitants are accustomed to supply themselves with limestone from them. They also use the stones of which these mounds are composed for the purposes of building; as the lava is so hard that it cannot be cut without the greatest difficulty, and they have no other stone in these parts.

Leaving this place, our author travelled over several extensive plains of lava, covered on each side of the way with stunted trees, but without any cultivation; the lava being of that kind which is very unfavourable to the growth of vegetables. Arriving at St Leonardo, he observed the course of the eruption of water in 1755, and which is mentioned under the former article *ÆTNA*.

Etna.

Fig. 1.

Account of the north-east side of the mountain.

3
Supposed to be in a state of decay.

4
Saussure's account of the height of Etna.

5
Mountains of calcareous matter.

This

E T N A.
Fig. 1.

Plate CLXXXIV.



Fig. 2.



W. Henshaw Sculp.



Etna.

6
Particular
account of
the erup-
tion of wa-
ter in 1755.

This water took its course down the west side of the mountain; and the channel which it cut for itself is still visible. The eruption of water from burning mountains is still much less frequent than that of lava or half vitrified solid matters, ashes, &c. though that of water, and even mixed with the shells of marine animals (though we are not told whether it was salt or not), has sometimes been observed in other volcanoes, particularly Vesuvius. The eruption we now speak of happened in the month of February 1755. It was preceded by an exceedingly thick black smoke issuing from the crater, intermixed with flashes of fire. This smoke gradually became thicker, and the bursts of flame more frequent. Earthquakes and subterraneous thunder convulsed the mountain, and struck the inhabitants of the adjacent parts with the utmost terror. On Sunday, the second of March, the mountain was seen to emit a huge column of smoke exceedingly dense and black, with a dreadful noise in the bowels of the earth, accompanied also with violent flashes of lightning. From time to time there were loud cracks, like the explosions of cannon; the mountain appeared to shake from its foundations; the air on that side next Mascalì became very dark, and loud peals of thunder were heard. These seemed to issue from two caverns, considerably below the summit, on the side of the mountain, and were accompanied with violent blasts of the wind like a tempest.

These terrible phenomena continued and increased; Etna seemed ready to swallow up at once all those materials which it had been for so many years disgorging, or rather about to sink at once into the bowels of the earth from whence it appeared to have been elevated. The prospect was far beyond any idea that can be given by description of this tremendous scene. The inhabitants were alarmed beyond measure; the sight of the flames driven by the wind against the sides of the mountain, the shocks of the earthquake, and the fall of rocks, struck the imagination with a horror not to be conceived. During this dreadful commotion an immense torrent of water was emitted from the highest crater of the mountain. The whole summit of Etna was at that time covered with a thick coating of snow. Through this the boiling water directed its course eastward; and, in its passage, met with frightful precipices. Over these it dashed with the utmost violence, adding its tremendous roaring to the complicated horrors of this awful scene. The snow, melting instantaneously as the boiling torrent advanced, increased its destructive power by augmenting its quantity, while the mischievous effects of the heat were scarce diminished by reason of the immense quantity of boiling liquid which continued to pour from the summit of the mountain.

This boiling torrent having dashed its awful cataracts from one chain of rocks to another, at length reached the cultivated plains, which it overflowed for a number of miles. Here it divided itself into several branches, forming as many deep and rapid rivers; which, after several other subdivisions, discharged themselves into the sea.

Though the mountain continued to discharge water in this manner only for half an hour, the ravages of it were very terrible. Not only those of common inundations, such as tearing up trees, hurrying along

rocks and large stones, took place here, but the still more dreadful effects of boiling water were felt. Every cultivated spot was laid waste, and every thing touched by it was destroyed. Even those who were placed beyond the reach of the torrent, beheld with inexpressible horror the destruction occasioned by it; and though the alarming noises which had so long issued from the mountain now ceased in a great measure, the shocks of earthquakes, and the violent smoke which continued to issue from the mountain, showed that the danger was not over. Two new openings were now observed, and two torrents of lava began to make their way through the snow.

On the 7th of March a dreadful noise was again heard in the bowels of the mountain, and a new column of very thick and black smoke began to issue from it. A horrid explosion of small stones succeeded; some of which were carried as far as the hills of Mascalì, and great quantities of black sand to Messina, and even quite over the strait to Reggio in Calabria. On the shifting of the wind to the northward this sand reached as far as the plains of Agosta. Two days after the mountain opened again, and a new torrent of lava was discharged; which, however, advanced very slowly towards the plain, moving only at the rate of a mile in a day. It continued to flow in this manner for six days, when every thing appeared so quiet, that the Canon Recupero set out to view the changes which had taken place.

That gentleman's design was to trace the course of the dreadful torrent of water abovementioned. This he was very easily enabled to do by the ravages it had made; and, by following the channel it had cut all the way from the sea to the summit of the volcano, he found that this immense quantity of water had issued from the very bowels of the mountain. After issuing from the crater, and increasing its stream by passing through and melting the snow which lay immediately below the summit, it destroyed in an instant a fine and extensive forest of fir trees. All of these were torn up by the violence of the current, though many were no less than 24 or 30 inches in diameter. He observed that the great stream had in its descent, divided itself into four branches; and these had again subdivided themselves into several smaller ones, easily distinguishable by the quantity of sand they had deposited. Afterwards reuniting their streams, they formed many islands, and rivers 900 feet in breadth, and of a depth which could not easily be determined. Proceeding farther down, and still forcing its way among the beds of old lava, the channel of the waters was widened to 1500 feet, until it was again contracted in the valleys as before. Every object which stood in the way of this tremendous torrent was moved from its place. Enormous rocks were not only hurried down, but several of them moved to more elevated situations than those they formerly occupied. Whole hills of lava had been removed and broken to pieces, and their fragments scattered along the course of the river, and the valleys were filled up by vast quantities of sand which the waters had deposited. Our author observed, that even at that time he visited the mountain, about 10 years after the eruption, the whole side of it still bore the marks of this deluge.

On M. Houel's arrival at Jaci Catena, he inquired

Etna.

7
Course of
the torrent
traced by
Recupero.

Etna. for the physician of the place; it being customary for strangers to do so who want to learn any thing concerning the curiosities of the country, as the physicians there are generally those who have any pretensions to literature. By this guide he was shown a well which they call *Holy Water*. There is a flight of steps from the surface of the ground to that of the water. The well itself is 20 feet wide and 40 feet deep. It is supplied by three different springs, each of which is said to have a peculiar taste. The physician informed our author, that one of them resembled milk in its taste; another tasted like soap; and the third had the taste of common water: but our author, after tasting each of them, could not find any remarkable difference.

8 Account of a remarkable well.

9 Ancient baths discovered.

In his way to La Trizza, our author discovered some very ancient baths with stoves. They had been built here on account of a spring of warm sulphureous water, supposed to be excellent for the cure of cutaneous disorders; and for which purpose they are still made use of. They are now called the *Springs of St Venera*, of whom there is an image here. The fountain from which they flow is on a level with the surface of the ground. The water tastes very disagreeably of sulphur; and deposits a quantity of white impalpable powder, adhering to herbs and stones, over which it passes. This substance our author calls the *cream of sulphur*; though it is probably a selenitic substance formed by the decomposition of the sulphur, and the union of its acid with some calcareous matter which held it in solution before.

11 Basaltic rocks about Trizza.

From this place our author proceeded to the sea-port of Trizza, a small place, which with the adjacent country contains only about 300 inhabitants. Off the harbour of this rock is a basaltic rock, which seems to be only the remains of a much larger one destroyed by the action of the air. All around are long ranges of basaltic rocks, the species of which are very various.

12 Rocks of the Cyclops.

The rocks of the Cyclops stand round the small harbour of La Trizza; and from this view we perceive a number of rocks of very different heights. All of them appear more or less above water, though some are so low that they cannot be seen without approaching very near; and this circumstance renders the harbour inaccessible to vessels of any considerable burden, at the same time that, by reason of the depth of the sea, it is impossible either to cut or unite them by a mole. The principal of these rocks is the extremity of an island, one half of which is composed of lava placed on a basaltic base; over this is a crust of pozzolano, combined with a kind of white calcareous matter of a pretty hard and compact consistence; and which, by the action of the air, assumes the appearance of knotty porous wood. On this subject our author observes, that "the rock, at some former period, had become so hard as to split, and the clefts were then filled up with a very hard matter which was porous on all sides like scoriae. That matter afterwards split also; leaving large interstices, which in their turn have been filled up with a kind of compound yellow matter. The island appears to have been formerly inhabited, but is at present destitute both of inhabitants and of culture, only the people of La Trizza feed a few goats upon it."

To the southward of the harbour of La Trizza we

observe several fragments of basaltic rocks, both in the form of needles and in that of prismatic columns of a very regular form, and which may be easily separated from one another. From the position in which these fragments are disposed, it appears that the mass to which they belong must have suffered some very violent shock; otherwise such huge rocks could never have been broken, overturned, and scattered in directions so very different from their original positions. In one of these ruins there are some parts harder than the rest, which withstand the action of the air, while the intervening spaces yield to it, and appear to be thus destroyed. In some others this effect is much more remarkable; because the column happens to be much farther advanced towards a state of dissolution, the parts of which they consist being already disjoined; and in each of those which project we perceive a fissure: which shows that each of those parts may be divided into two. "They are indeed (says our author) actually divided, and display a convexity issuing from a concavity, like a pile of hats placed one upon another, when they are removed one by one; which is a very curious singularity."

Continuing his journey still southward, our author arrived at the promontory of the Castel d'Aci. This is the most singularly curious of all that are in the neighbourhood of Etna. The ancient mass of it is inclosed between two bodies of lava of a more modern origin. These compose the rocks on which Castel d'Aci is situated, and which lie under the soil of the adjacent country. Beyond that city are the immense plains of the lower part of Etna. These gradually rise till they reach the summit, which is hid among the clouds. The promontory is almost entirely composed of basaltic rocks, the interstices of which are filled up with a yellowish matter, which seems to be a clay nearly of the same nature with that formerly taken notice of in the island of La Trizza, it also covers the mass of basaltic rocks, and has produced both the superior and anterior parts of the promontory. Here our author saw a number of women employed in washing webs of cloth in the sea; and takes notice of the dexterous method they have of lifting it up in folds, and packing it on their heads in bundles without receiving any assistance. At the foot of this promontory are many curious basaltic rocks.

All along the eastern side of Mount Etna the soil is broken, but filled with beautiful varieties of basaltic rocks, highly worthy of observation. Indeed, according to our author's opinion, there is no volcano in Europe so rich as Etna in basaltic rocks, nor where so many curious figures of it are to be seen.

Mr Houel having spent some more time in visiting the basaltic columns around the foot of the mountain, set out from Aci to visit the famous chestnut-tree, mentioned under the article *ÆTNA*, and which is known in that country by the name of *The chestnut-tree for an hundred horses*. In his way thither he passed through the villages of Fortezza, Mangano, St Leonardo, St Matteo, and La Macchia. The landscapes of each of these places by itself are extremely beautiful; but the country between them is a frightful wild desert, presenting to the eye nothing but extensive plains of black lava, which at a distance have the appearance of vast quantities of pit-coal. The roads became rougher as they

Etna.
13
Different kinds of basaltic rocks.

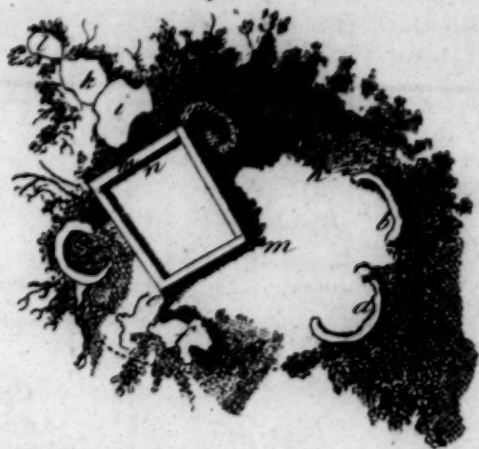
14
Promontory of the Castel d'Aci described.

15
Great quantity of basaltic rocks found on Etna.

16
Mr Houel's journey to the great chestnut-tree.



Plan of the Tree.



Eunaceus or Hedgehog.

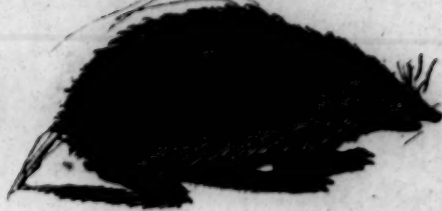
Common.



Guinea.



Malacca.



J. Frenchard Sculp.



Etna.

they advanced; but the adjoining fields assumed a more smiling aspect. The reason of this is, that the torrents of lava (by which the plains are rendered unfit for vegetation for a great number of years) have rolled rapidly down the more steep sides of the mountain without destroying the fertility of the soil.

17
Great num-
bers of
chestnut-
trees culti-
vated on
this side
of Etna.

18
Particular
account of
the great
tree.

Travelling through very difficult roads, and often incommoded with dangerous precipices, our author at last arrived at the celebrated chestnut-tree, which was the chief object of this journey. He observes, that all over this side of the mountain the chestnut trees thrive very well, and are carefully cultivated by the inhabitants. They are worked into hoops for casks, and a considerable trade is carried on in this article. The great one which he came to visit, exceeds the size of other trees so much that it cannot fail to excite the greatest admiration. It has its name from the following circumstance. Jean of Arragon spent some time in Sicily on her way from Spain to Naples: While here she visited Mount Etna, attended by her principal nobility; and happening to be overtaken by a storm, they took shelter under this tree, whose branches were sufficiently extensive to cover them all. By others, however, this story is treated as a mere fable.

19
An house
and oven
built in the
hollow of
it.

20
Is not com-
posed of a
number of
trees grown
together.
Plate
CLXXXV

According to our author's account, this chestnut tree, is 160 feet in circumference, but quite hollow within: which, however, affects not its verdure; for the chestnut tree, like the willow, depends upon its bark for subsistence, and by age loses its internal part. As the cavity of this enormous mass is very considerable, the people have built an house in it, where they have an oven for drying nuts, almonds, and chestnuts, &c. of which they make conserves. They frequently supply themselves with wood from the tree which incircles their house, so that it seems likely, in a short time to go to ruin through the ingratitude and thoughtlessness of its inhabitants.

It has been thought that this tree was composed of a number of others grown together; but our author is of a different opinion. In describing it particularly, however, we must separate it from the trunks *i, k, l*, (on the plan), which properly belong to three other trees. The dotted line, and the letters *a, b, c, d, e, f, g*, mark out the true circumference of the tree we speak of. The parts of that circumference are not all contiguous, several pieces having been taken away from the places marked *g* and *n*, between which the house stands. In other places the bark is rent asunder; but, says our author, "by a natural motion, the divided parts seeking to reunite, or rather to shelter themselves from the action of the external air, are bent inwards so as to form the circular arcs *a, b, c, d*, which may indeed be taken for so many different trees, though they appear properly to belong to the same trunk.

21
Other trees
of vast di-
mensions.

Besides this, there are abundance of other trees in the neighbourhood very remarkable for their size. Our traveller was shown a number of young trees of the same species, all very beautiful and straight, and almost as smooth as polished marble. One of these was 38 feet in circumference, and there were a number of others nearly of the same size. Among these there were seven standing together, which have received the name of the *seven brethren*. Another is denominated *the ship*, from the general figure of its top,

which has some slight resemblance to a ship. Its diameter is 25 feet, so that the circumference cannot be less than 75. In these extensive forests, however, there are chestnut trees of every age and size.

Our author's next visit was paid to a snow grotto, being one of those magazines where that article, so necessary in the hot climate of Sicily, is preserved for use. In his way thither he visited the forest of pines; which is so much surrounded by rocks and precipices, that it is scarce accessible; and vast numbers of the trees are dying of old age. Some of the neighbouring peasants, however, will now and then attempt to carry them off. Our author saw one of them at this work. It was drawn by oxen, who were yoked to it by a chain connected with the beam of an iron cramp. But the extreme roughness of the road made the tree leap and bound in such a manner, that the poor creatures were every moment in danger of having their legs broken, or being hurried over precipices along with their driver; accidents which happen not unfrequently, and which render this occupation less generally practised than otherwise it would be.

The snow grotto is but lately formed by the action of the waters under the beds of lava, and carrying away the stratum of pozzolana below them. It is situated on a mountain named *Finocchio*, which though of very considerable size, is only a protuberance on the side of Etna. It has been repaired in the inside at the expense of the knights of Malta, who have hired this as well as several other caverns in the mountain for the purpose of holding snow, which they have still more occasion for in their island than the inhabitants of Sicily. There are two openings above, at which they throw in the snow; and flights of steps have been cut to these as well as to the internal parts. A considerable extent of ground is levelled and inclosed with high walls above the grotto: so that when the wind, which at this elevation blows with great violence, carries the snow down from the higher parts of the mountain, it is stopped and detained by the walls of this inclosure. It is then thrown into the grotto, where the thickness of the beds of lava which cover it prevents any impression from the summer-heat. When the season for exportation comes, the snow is put into large bags, and pressed into them as close as possible. Thus it is rendered compact and heavy, and likewise runs less risk of being affected by the heat. It is then carried on upon men's shoulders, and conveyed to the shore on mules. Before it is put into the bags, the lumps of snow are carefully wrapped up in leaves, which is another preservative; at the same time that the fresh congelation of the little which melts, unites the masses so together, that our author informs us he has seen pieces of the snow preserved in this manner which looked like the fairest and most transparent crystal.

Our author's next excursion was to Mount Rosso, or the Red Mountain, which is one of the mouths of Etna, and through which it discharges from time to time great quantities of lava, sand, ashes, &c. It is the most celebrated of all the numerous mouths which have opened on the side of the mountain, though it has become so noted only for having poured forth the matter of the great eruption in 1669, and which is the most remarkable of any recorded in history.

"When a new crater (says our author) is formed on

Etna.

22

Snow grot-
to descri-
bed.

23

Forest of
pines in the
way to it.

24

How the
snow is pre-
vented
from melt-
ing during
exporta-
tion.

25

Account of
mount
Rosso.

Etna.
26
New craters how formed.

on mount Etna, it is always in consequence of some shock that is powerful enough to break the arches of its caverns. Doubtless it is inconceivable that there should be any agent endowed with such force; but when such a fracture is once made, it is necessarily very large, and the surface of the ground above cannot but be broken in several different places at considerable distances from one another. The matter which is discharged always issues from the principal opening and those adjoining to it. None of these mouths, however, continue open, excepting that which is directly in the line in which the matter is discharged; the lava soon choking up those which are in a more oblique direction."

Our author went down one of these openings with torches; but could not reach the bottom, and was obliged to return on account of the extreme cold. The descent was extremely difficult, and became more so in proportion as he advanced. This crater is of an oval form, and the opening through which he descended was in one extremity: but he was tempted to think that the crater which rises above it had been formed of matter discharged by another mouth; or perhaps it might have had a more central opening, through which the stones, sand, &c. which form the crater, were discharged.

Four of the mouths of this mount appear to be composed of a reddish pozzolana, which has procured it the name of the *Red Mountain*; but when we ascend the pyramids, or rather funnels which they form, we find them composed of different kind of layers of sand. Some of these are of a bluish grey colour, others of a fine yellow, and some of a kind of green formed by a mixture of grey and yellow, while others are of a red colour. A great number of small crystals, black schoerls, and granites are found among them, as well as pieces of scoria, which had been discharged by the volcano in the form of a thick and glutinous matter. All these mouths have internally the form of a funnel, and their shape is nearly that of a mutilated cone or round pyramid. This is the natural and unavoidable consequence of the perpendicular fall of the pulverised matter which the volcano discharges from the orifice at the bottom. The sides of the craters are not all of one height; the parts to the east and west being considerably higher than the intermediate summits, because the currents of the ashes passed alternately from east to west, and fell upon these sides in greater quantities than on the others; which circumstance has given to this volcano the appearance of having two summits.

27
Convent of Nicolosi described.

M. Houel, having finished his observations on Monte Rosso, returned to the convent of Nicolosi, which is now only an house for the entertainment of travellers. The Benedictines of Catana, to whom it belongs, visit this place only when in an ill state of health, as the purity of the air renders it very salutary to the human constitution. A solitary brother, however, resides here to take care of the house, and to superintend the cultivation of the neighbouring plains. Those fathers once possessed an extensive and very fertile tract of land in this neighbourhood; but the eruptions of Etna have rendered it totally incapable of cultivation. This house stands at a very considerable height, being no less than 2496 feet above the level of the sea. Setting out from this place three hours before day, our

traveller directed his course towards the grotto of the goats. In his way thither, he passed over several plains of lava, some of them ancient and others more modern: but the roads were extremely rough and dangerous; or rather, as our author expressed himself, there was no track or path meriting the name of a road. In two hours they reached the Regione Sylvosa, where an immense forest surrounds the mountain, and which has undoubtedly been planted by the hand of nature: for the ground there is so high, so full of precipices, and so entirely uninhabitable, that no human being could ever think of making plantations on it; nor is it to be supposed that the winds could take up seeds from the plains to sow them on such a lofty situation.

These majestic forests of Etna afford a singular spectacle, and bear no resemblance to those of other countries. Their verdure is more lively, and the trees of which they consist are of a greater height. These advantages they owe to the soil whereon they grow; for the soil produced by volcanoes is particularly favourable to vegetation, and every species of plants grows here with great luxuriance. In several places where we can view their interior parts, the most enchanting prospects are displayed. The hawthorn trees are of an immense size. Our author saw several of them of a regular form, and which he was almost tempted to take for large orange-trees cut artificially into the figures they represented. The beeches appear like as many ramified pillars, and the tufted branches of the oak like close bushes impenetrable to the rays of the sun. The appearance of the woods in general is exceedingly picturesque, both by reason of the great number and variety of the trees, and the inequality of the ground, which makes them rise like the seats in an amphitheatre, one row above another; disposing them also in groups and glades, so that their appearance changes to the eye at every step: and this variety is augmented by accidental circumstances, as the situation of young trees among others venerable for their antiquity; the effects of storms which have often overturned large trees, while stems shooting up from their roots, like the Lernaean hydra, show a number of heads newly sprung to make up that which was cut off.

About three hours after the departure of our travellers from St Nicholas, they reached the grotto of the goats. It is formed by a bed of lava, which having flowed over a pile of sand and pozzolana while in a fluid state, settled and cooled in that situation; and the sand or pozzolana being afterwards carried off by the filtration of water through the lava, a void space has been left, which the torrents have gradually enlarged to its present size.

This grotto stands about 5054 feet above the level of the sea, according to the calculations of M. de Saussure. It affords a retreat for those travellers who visit the summit of Etna, who generally refresh themselves by taking a repast and making a fire at the entry, for which there is plenty of dry wood at hand; while the sand serves for a bed to repose on. Here our author and his company supped, and about midnight set off for the summit. They had the advantage of the moon-light; and our author advises all those who intend to visit the top of Etna to take such a time for their journey as may enable them to enjoy this advantage.

Etna.
28
Grotto of the goats described.

29
Regione Sylvosa described.

30
Beautiful appearance of the forests of Etna.

31
Grotto of the goats, how formed.

³² ^{Etna.} ^{Account of the highest parts of Etna.} tage. As they advanced beyond the grotto of the goats the trees became gradually thinner. In a short time they were so thin, that they might readily be counted; and, proceeding still farther, only a very few were seen scattered here and there, whose beauty and size were diminished seemingly in proportion to their numbers. A few clumps of trees and some tufts of odoriferous herbs were now only to be seen; and in a little time these also became thinner, assuming a withered or stunted appearance. Then they are nothing but the languishing remains of an abortive vegetation; and a few paces further not even this appeared, the eye being presented only with barren sand.

³³ ^{Snowy and barren region described.} Having now got above the region of the trees, they entered the third, which our author denominates the region of snow and sterility. The wind became more brisk and keen as they advanced, so that they could scarce keep their hats upon their heads; and our author lost his, though tied on with an handkerchief. Here they were frequently obliged to cross considerable streams of water formed by the melting of the snow. In general the surface was sufficiently hard to bear them; but our author's mule once sunk up to her belly, and was not extricated without great difficulty.

³⁴ ^{Plain on the summit of Etna.} Having at last overcome all difficulties, they arrived at the large plain on the summit of Etna, and in the midst of which is the crater of the volcano. It is entirely composed of lava, cinders, ice, and snow; nevertheless is styled, ironically as our author thinks, *Monte Friumante*.

³³ ^{Wind excessively violent here.} Here the wind continued to blow with excessive violence; and our author informs us, that in order to have any notion of its keenness, we must be accustomed to feel it on some very elevated station, as it is impossible to judge from what we feel at inferior altitudes. They took shelter behind a lump of lava, the only one which appeared in the whole plain, and, which our author says, would seem designed expressly for the shelter of travellers. Here they lay, wrapped up in their cloaks, for an hour; but as soon as it was day, so that they could distinguish the place where the sun was to rise, they got up and advanced towards the ruins of the building known by the name of the *Philosopher's Tower*. The wind still blew so violently, that after an effort of four minutes they fell down exhausted; but the extreme cold obliging them again to get up, they made a second attempt; and after several intermissions of this kind, at last accomplished their design. They were surprised, however, to find nothing but the corner of a wall not more than two feet high, consisting of two rows of unpolished stones; great part of it having been probably buried by the sand and other matters discharged by the mountain. Here, being sheltered from the wind, and the day advancing, they began to enjoy the glorious prospect which every moment became more extensive. At the rising of the sun, the horizon was serene, without a single cloud. "The coast of Calabria (says our author) was as yet undistinguishable from the adjoining sea; but in a short time a fiery radiance began to appear from behind the Italian hills, which bounded the eastern part of the prospect. The fleecy clouds, which generally appear early in the morning, were tinged with purple; the atmosphere became strongly illuminated, and, reflecting the rays of the rising sun, appeared filled with a bright effulgence of flame. The immense elevation of the summit of Et-

na made it catch the first rays of the sun's light, whose vast splendor, while it dazzled the eyes, diffused a most cherishing and enlivening heat, reviving the spirits, and diffusing a pleasant sensation throughout the soul. But though the heavens were thus enlightened, the sea still retained its dark azure, and the fields and forests did not yet reflect the rays of the sun. The gradual rising of this luminary, however, soon diffused his light over the hills which lie below the peak of Etna. This last stood like an island in the midst of the ocean, with luminous points every moment multiplying around, and spreading over a wider extent with the greatest rapidity. It was as if the universe had been observed suddenly springing from the night of non-existence. The tall forests, the lofty hills, and extensive plains of Etna, now presented themselves to view. Its base, the vast tracts of level ground which lie adjacent, the cities of Sicily, its parched shores, with the dashing waves and vast expanse of the ocean, gradually presented themselves, while some fleeting vapours, which moved swiftly before the wind, sometimes veiled part of this vast and magnificent prospect." In a short time every thing was displayed so distinctly, that they could plainly recognize all those places with which they were before acquainted. On the south were seen the hills of Camerata and Trapani; on the north, the mounts Pelegrino and Thermini, with the celebrated Enna once crowned with the temples of Ceres and Proserpine. Among these mountains are seen a great many rivers running down and appearing like as many lines of glittering silver winding through a variety of rich and fertile fields, washing the walls of 20 cities, while their banks were otherwise filled with villages, hamlets, &c. rising among the ruins of the most illustrious republics of antiquity. On the south and north were observed the rivers which bound by their course the vast base of mount Etna, and afford a delightful prospect to the eye; while at a much greater distance were seen the isles of Lipari, Alicudi, Felicicide, Parinacia, and Stromboli.

Having enjoyed for some time the beauty of this magnificent prospect, our author set about making a draught of the place from which the view was taken; and at length accomplished it, notwithstanding the great impediments he met with from the wind. Among the objects which he delineated on this occasion, the Philosopher's Tower was one. It seems, he says, not to be very ancient; neither the materials of which it consists, nor the mode of architecture, bearing any resemblance to those of the Greeks and Romans. The surrounding plains seem to consist entirely of a black sand intermixed with pieces of scoria, which have been formerly thrown out by the volcano. Beyond that plain, which rises gently, appears a cone, the summit of which is the volcanic crater. When viewed from the south side, on which they stood, this crater seems to consist of a number of small hills. Into these it was broken by the emission of the boiling torrent in the year 1755. When discharged from the crater, these waters spread towards the right, and at the distance of a mile eastward fell in a cascade from a prodigious height.

The violence of the wind beginning now to abate a little, the travellers set out for the very summit, in order to take a view of the great crater; in which journey

Etna.

³⁸ ^{Philosopher's tower described.}

³⁹ ^{Description of the great crater.}

Etna.

(our author says) it would be difficult to make people, who have never engaged in such enterprises, comprehend all the obstacles they had to encounter. This cone (the little mountain mentioned by Sir William Hamilton) is composed of ashes, sand, and pozzolano, thrown up at different times by the volcano. The materials are so loose, that the adventurous traveller sinks about mid-leg at every step, and is in constant terror of being swallowed up. At last, when the summit is reached, the sulphureous exhalations, which are continually emitted from the pores of the mountain, threaten suffocation, and irritate the fauces and lungs in such a manner as to produce a very troublesome and incessant cough. The looseness of the soil, which gives way under the feet, obliges the traveller, every now and then, to throw himself flat on his belly, that so he may be in less danger of sinking. In this posture our author viewed the wide unfathomable gulph in the middle of the crater; but could discover nothing except a cloud of smoke, which issued from a number of small apertures scattered all around, and accompanied with a kind of noise. Another and more dreadful sound, however, issues from the bowels of the volcano, and which, according to our author, "strikes the heart with terror, so that all the strength of reason is necessary to prevent the observer from flying with precipitation from such a dreadful place." Several travellers who had visited this cone before him, were so terrified by these dreadful sounds, that they fled with the utmost haste till they arrived at the foot of the mountain.

Our author compares these sounds to a discharge of cannon in the wide abyss; the noise of which is rebellowed throughout all the caverns, and produce a sound perhaps the most alarming that can be imagined; and during the short space in which he listened, several of these discharges were heard to follow one another almost uninterruptedly.

This dreadful noise, our author, with very great probability, supposes to be occasioned by the explosions of the internal fire, or, as he calls it, the *focus* of the volcano; which, striking against the sides of these immense caverns, the sounds produced are re-echoed through their cavities, and probably multiplied in an extraordinary manner; so that what would be only a slight explosion in the open air, occasions a sound more tremendous than the loudest thunder. To such as are convinced of this, and have sufficient courage to resist the first impressions which these sounds must unavoidably occasion, they will in a short time not only appear exceedingly sublime, but, by their variety, even somewhat agreeable. "They enable us (says our author) to form some conception of the space through which they must pass before they reach the ear, and of the vast extent and width of the hollows of the mountain."

Having for some time contemplated this awful spectacle, our author wished to measure the crater by walking round it; but found this impossible. On the north side the surface is hard and smooth, the ashes having been so far dissolved by the moisture deposited by the smoke as to cement into one uniform mass. This is sometimes dissolved even into a fluid state, in such a manner as to run down the sides of the cone; so that after several attempts, he was at last obliged to abandon his design.

41
Impossible
to walk
round the
crater.

Pat
CLXXXIV.

Fig. 2. exhibits a view of the crater of Etna taken

I

on the brink of the east side. The fore-ground (*aa*) of the figure is one division of the crater. Beyond it are two eminences *b* and *c*, higher than that on which some human figures are represented. All the three form a triangle nearly equilateral; but, when viewed from any considerable distance, only two of them can be seen; for which reason the Sicilians have termed the mountain *bicornæ*, or double-horned.

The smoke, as represented in the figure, issues from all quarters, either from chinks or holes scattered over the whole crater. But the situation of the principal mouth is in the midst of the three eminences. Its diameter, when our author visited this mountain, was only about 60 feet, and so filled with smoke that nothing remarkable could be discovered. From the height *d*, the rock situated on the left side of the point, and on which the human figures are represented, all the way to the rock *e* on the right, the distance is no more than 900 feet. Our author observed that the cone is not exactly in the middle of the plain, but is situated more towards the north than the south. He did not attempt to cross the central valley, *f*, on account of the looseness of the ground, and that there was no object apparently worthy of the risk he must run in so doing. At the nearest view he took, it was only observed that there was snow lying in several parts of it, though the heat which otherwise prevailed seemed to be very intense.

The smoke which issues from the crater of Etna is generally carried in a direction from south to north; and, as it brings along with it a considerable quantity of water, the latter, condensed by the cold winds, runs down the side of the mountain in plentiful streams, and often leaves pretty permanent marks of its course. In this manner he accounts for the great eruption of water, in 1755, which he supposes to have been occasioned only by an unusual quantity of water falling into the burning focus of the mountain, there rarefied into steam, and afterwards condensed by the coldness of the atmosphere.

Like other travellers to mount Etna, this gentleman found the wind blowing from the south; and he is of opinion, that a southwind blows here more frequently than any other, as he did not observe any channels cut by the water on any other side than the north. He had several opportunities of making this observation, having frequently visited the top of Etna, and always paid attention to the crater. The sand on the east and west sides was always loose, while that on the north was compacted into a solid body. The three summits were of a later date than the rest of the crater, having been probably thrown up by some eruption which had burst it asunder. The black spots on the fore-ground represent a number of hillocks about the size of mole hills, from which a sulphureous vapour constantly issues, and by which the adjacent ground is tinged of an ochery colour. This vapour issues from the crevices with a kind of hollow whistling noise; which with the volcanic thunder, smoke, and noxious smell, render it very disagreeable to stay here even for a few moments.

The smoke is represented in the figure precisely as it did on the day that he ascended, which was very warm. But it does not always rise in this manner; for when the cold is very intense, it collects into a body, and thickens around the edge of the crater: on which occasions it is condensed into water, which diffuses itself around the edge of the crater, and mixing with the

Etna.

42
Explanation
of the
figure of
the crater.

43
Eruption of
water in
1755 ac-
counted
for.

44
South wind
generally
prevailent
on the top
of Etna.

ashes

Etna. 45
Intense cold produced by a south wind.

ashes converts them into a kind of clay. The cold on the top of this mountain is so intense, that travellers very often find their clothes insufficient to protect them; and it is remarkable that such intense cold is always produced by a south wind. The day that our author took his draught, the wind blew faintly from the north.

46
Account of the strata at the foot of mount Etna.

The base of mount Etna, according to Mr Houel's observations, consists of alternate layers of lava and marine substances, which have been deposited successively one upon another. These alternate layers extend to an unknown depth. They must indeed go as far down as the level of the stratum of lava which was discharged by the volcano at its first origin. The last deposited by the sea is a range of calcareous mountains of a considerable height, and which are placed on a basis of lava. Beneath that layer of lava is another of sea-pebbles, which are well known to be rounded by their attrition against one another by the motion of the waves. This layer is of considerable depth, and lies upon a yellowish rock consisting of a species of indurated sand. The river Simeto flows over this rock, which it has cut away considerably. That part which is at present the bed of the river is much higher than the base of Etna that is on a level with the sea; and not the least thing occurs to suggest an idea of what has been the primary base of the volcano. The marine substances, already taken notice of, lie nearly in an horizontal direction, more or less so according to the nature of the surface on which they have been deposited.

47
Great number of springs on Mount Etna.

Etna abounds very much with springs, fountains, and even rivers of considerable magnitude. Our author has computed, that if all the water flowing down the sides of this mountain were collected, it would fill the channel of a river 36 feet broad and 6 in depth. Many of the springs afford fine salt; some are very pure, and others are impregnated with noxious substances; while others are remarkable for their use in dyeing particular colours.

48
Whence such a large quantity of water is derived.

"It is worthy of notice (says our author), that streams of water, some of them more copious, others more scanty, are seen to issue at all different degrees of height, from the base to the summit of the mountain. Even in summer, when very little rain falls for three or four months, or when perhaps for that space there is no rain at all, and for three of which at least there is not an ounce of snow melted; even then a great number of rivulets continue to flow down the sides of Etna; and at the same time a number of streams, external and subterraneous, each of them several feet wide, are, according to the accounts of the country people, plentifully supplied with water.

49
Produced by the internal evaporation of the mountain.

"As the trifling quantity of snow which is melted here even in the midst of summer, and the still smaller quantity deposited by the clouds, would be totally insufficient to supply those streams, and must be all absorbed by the earth for the support of vegetation, those streams must proceed from some other cause, whose effects are more copious and permanent. This cause is the evaporation of those aqueous particles which arise from the constant ebullition at the bottom of the volcanic focus. These issuing out at the great crater, and at innumerable chinks in the sides of the mountain, are soon condensed by the cold of that elevated region of the atmosphere,

and, percolating through the earth, give birth to those numerous streams in question.

"A volcano, according to my ideas, cannot subsist without water; nor can water occupy a place in any volcanic focus without being changed into vapour. But before that water can make its appearance, except in the form of smoke, it must have filled the whole volcanic cavern, and must have been forcibly pressed by the action of the fire against its sides: it must next have condensed, and assumed the form of water; in which state it must have penetrated through the inclined layers of sand and pozzolano which intervene betwixt the different strata of lava; for these strata lie one above another, and are full of chinks, in such a manner as to present to the eye an appearance pretty much resembling that of the inside of a tiled roof."

It has been a question, Whether the eruptions of mount Etna were more frequent in ancient than in modern times? At first it seems impossible to give a precise answer to such a question; but when we consider, that the matter in the volcanic focus was then greater in quantity than at present, in proportion to the space which it occupied: that the cavities were then sooner filled with vapour; and that the centre of the focus was then less remote, we will not hesitate to pronounce, that in earlier times the eruptions were more frequent as well as more copious.

We shall close this article with an enumeration of all the different eruptions from mount Etna which are found upon record.

1. The first mentioned in history, is that of which Diodorus Siculus speaks, but without fixing the period at which it happened. That eruption, says he, obliged the Sicani, who then inhabited Sicily, to forsake the eastern, and retire to the southern, part of the island. A long time after that the Sicilians, a people of Italy, migrated into Sicily, and took up their abode in that part of the island which had been left desert by the Sicani.

2. The second eruption known to have issued from this volcano, is the first of the three mentioned by Thucydides; of none of which he fixes the date, mentioning only in general, that from the arrival of the first Greek colonies that settled in Sicily (which was in the 11th Olympiad, and corresponds to the 734th year before the Christian era), to the 88th Olympiad, or the year 425th before Christ, Etna at three different times discharged torrents of fire. This second eruption happened, according to Eusebius, in the days of Phalaris, in the 565th year before the Christian era. The assertion of Eusebius is confirmed by a letter from that tyrant to the citizens of Catania, and the answer of the Catanians (if, after Bentley's Dissertations against their authenticity, any credit be due to the epistles of Phalaris). But Diodorus gives both these pieces.

3. The third, which is the second of the three mentioned by Thucydides, happened in the 65th Olympiad, in the 477th year before the Christian era, when Xantippus was archon at Athens. It was in this same year the Athenians gained their boasted victory over Xerxes's general Mardonius near Plataea. Both the eruption of the volcano and the victory of the Athenians are commemorated in an ancient inscription on a marble table which still remains. An ancient medal

Etna.

exhibits a representation of an astonishing deed to which that eruption gave occasion. Two heroic youths boldly ventured into the midst of the flames to save their parents. Their names, which well deserved to be transmitted to future ages, were Amphinomus and Anapius. The citizens of Catania rewarded so noble a deed with a temple and divine honours. Seneca, Silius Italicus, Valerius Maximus, and other ancient authors, mention the heroism of the youths with just applause.

4. The fourth eruption, the third and last of those mentioned by Thucydides, broke out in the 88th Olympiad, in the 425th year before the Christian era. It laid waste the territory of Catania.

5. The fifth is mentioned by Julius Obsequens and Orosius, who date it in the consulship of Sergius Fulvius Flaccus and Quintus Calpurnius Piso, nearly 133 years before the Christian era. It was considerable; but no peculiar facts are related concerning it.

6. In the consulship of Lucius Emilius Lepidus and Lucius Aurelius Orestes, in the 125th year before the Christian era, Sicily suffered by a violent earthquake. Such a deluge of fire streamed from Etna as to render the adjoining sea into which it poured absolutely hot. Orosius says, that a prodigious quantity of fishes were destroyed by it. Julius Obsequens relates, that the inhabitants of the isles of Lipari eat such a number of those fishes, as to suffer in consequence of it, by a distemper which proved very generally mortal.

7. Four years after the last mentioned, the city of Catania was desolated by another eruption not less violent. Orosius relates, that the roofs of the houses were broken down by the burning ashes which fell upon them. It was so dreadfully ravaged, that the Romans found it necessary to grant the inhabitants an exemption from all taxes for the space of ten years, to enable them to repair it.

8. A short time before the death of Cæsar, in the 43d year before Jesus Christ, there was an eruption from mount Etna. Livy mentions it. It was not distinguished by any thing extraordinary. It was afterwards considered as an omen of the death of Cæsar.

9. Suetonius, in the life of Caligula, mentions an eruption from mount Etna which happened in the 40th year after the Christian era. The emperor fled on the very night on which it happened, from Messina, where he at that time happened to be.

10. Carrera relates, that in the year 253, there was an eruption from mount Etna.

11. He speaks of another in the year 420; which is also mentioned by Photius.

12. In the reign of Charlemagne, in the year 812, there was an eruption from Etna. Geoffroy of Viterbo mentions it in his Chronicle.

13. In the year 1169, on the 4th of February, about day-break, there was an earthquake in Sicily, which was felt as far as Reggio, on the opposite side of the strait. Catania was reduced by it to ruins; and in that city more than 15,000 souls perished. The bishop, with 44 monks of the order of St Benedict, were buried under the ruins of the roof of the church of St Agatha. Many castles in the territory of Catania and Syracuse were overturned; new rivers burst forth, and ancient rivers disappeared. The ridge of the mountain was observed to sink on the side next

Taormina. The spring of Arethusa, so famous for the purity and sweetness of its waters, then became muddy and brackish. The fountain of Ajo, which rises from the village of Saraceni, ceased to flow for two hours; at the end of which the water gushed out more copiously than before. Its waters assumed a blood-colour, and retained it for about an hour. At Messina, the sea, without any considerable agitation, retired a good way within its ordinary limits; but soon after returning, it rose beyond them, advanced to the walls of the city, and entered the streets through the gates. A number of people who had fled to the shore for safety were swallowed up by the waves. Ludovico Aurelio relates that the vines, corn, and trees of all sorts, were burnt up, and the fields covered over with such a quantity of stones as rendered them unfit for cultivation.

14. Twelve years after this, in the year 1181, a dreadful eruption issued from Etna on the east side. Streams of fire ran down the declivity of the mountain, and encircled the church of St Stephen, but without burning it.

Nicholas Speciale, who relates, though he did not see this event, was witness to another conflagration on Etna 48 years after this, in the year 1329, on the 23d of June, of which he has given a description.

15. On that day, says he, about the hour of vespers, Etna was strongly convulsed, and uttered dreadful noises; not only the inhabitants of the mountain, but all Sicily, were struck with consternation and alarm. On a sudden, a terrible blaze of fire issued from the southern summit, and spread over the rocks of Mazarra, which are always covered with snow. Together with the fire, there appeared a great deal of smoke. After sun-set, the flames and the stones that issued out with them were seen to touch the clouds. The fire making way for itself with the most furious impetuosity, burnt up or reduced to ruins all those structures which the piety of former times had consecrated to the Deity. The earth yawning, swallowing up a great many springs and rivulets. Many of the rocks on the shore of Mascalì were shaken and dashed into the sea. A succession of these calamities continued till the 25th of July, when the bowels of Etna were again heard to rebel. The conflagration of Mazarra still went on unextinguished. The earth opened near the church of St John, called *Il Paparinacca*: In the south side fire issued from the gap with great violence: to add to the horrors of the day, the sun was obscured from morning to evening with clouds of smoke and ashes, as entirely as in an eclipse. Nicholas Speciale went towards the new-opened crater, to observe the fire and the burning stones which were issuing from the volcano. The earth rebellowed and tottered under his feet; and he saw red-hot stones issue four times successively in a very short space from the crater, with a thundering noise, the like of which, he says, he had never before heard.

In a few days after this, all the adjacent fields were burnt up by a shower of fire and sulphureous ashes; and both birds and quadrupeds being thus left destitute of food, died in great numbers. A great quantity of fishes likewise died in the rivers and the contiguous parts of the sea. "I cannot think (says he) that either Babylon or Sodom was destroyed with such awful

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ful severity." The north winds, which blew at the time, carried the ashes as far as Malta. Many persons of both sexes died of terror.

16. Scarce had four years elapsed after this terrible event, when Etna made a new explosion, and discharged volleys of stones, causing the neighbouring fields to tremble. This happened in the year 1333.

17. Forty-eight years after this, on the 25th of August 1381, an eruption from Etna spread its ravages over the confines of the territory of Catania, and burnt up the olive-yards in the neighbourhood of that city.

18. In the year 1444, 63 years after the last eruption, a torrent of lava issued from Etna and ran towards Catania. The mountain shook; and the shocks were so violent, that several huge masses of rock were broken from its summit, and hurled into the abyss with a tremendous noise.

19. After this Etna was scarce at rest for 18 months or 2 years. On Sunday the 25th of September 1446, about an hour after sun-set, an eruption issued from the place called *La Pietra di Mazarra*. This eruption was soon over.

20. On the following year 1447, on the 21st of September, there was another, with a good deal of fire; but this eruption was likewise of short duration.

21. Etna now ceased to emit fire, and that for a considerable time. The neighbouring inhabitants not only ascended to the summit of the mountain, but even, if we may credit accounts, went down into the fiery gulph, and believed the volcanic matter to be now exhausted: But on the 25th of April 1536, near a century from the slight eruption in 1447, a strong wind arose from the west, and a thick cloud, reddish in the middle, appeared over the summit of the mountain. At the very same instant a large body of fire issued from the abyss, and fell with the noise and rapidity of a torrent along the eastern side of the mountain, breaking down the rocks, and destroying the flocks and every other animal that was exposed to its fury. From the same crater, on the summit of the mountain, there issued at the same time a stream of fire more terrible than the other, and held its course towards the west. It run over Bronte, Adrans, and Castelli. It consisted entirely of sulphur and bitumen. On the same day the church of St Leon, which stood in a wood, was first demolished by the shocks of the earthquake, and its ruins after that consumed by the fire. Many chasms were opened in the sides of the mountain; and from those issued fire and burning stones, which darted up into the air with a noise like that produced by a smart discharge of artillery. Francis Negro de Piazza, a celebrated physician, who lived at Lentini, wishing to have a nearer view of the eruptions, and to make some observations which he thought might be of consequence, was carried off and burnt to ashes by a volley of the burning stones. This conflagration of Etna lasted some weeks.

22. In less than a year, on the 17th of April 1537, the river Simeto swelled so amazingly as to overflow the adjacent plains, and carry off the country people and their cattle and other animals. At the same time, the country around Paterno, the neighbouring castles, and more than 500 houses, were destroyed by the ravages

of the river; and most of the wood was torn up by the roots by violent blasts of wind. These ravages of the elements were occasioned by Etna, which on the 11th of the following month was rent in severable places, disclosing fiery gulphs, and pouring out a deluge of fire in more terrible torrents than those of the preceding year. They directed their course towards the monastery of St Nicholas d'Arena; destroyed the gardens and vineyards; and proceeding onwards towards Nicolosi, burnt Montpelliceri and Fallica, and destroyed the vineyards and most of the inhabitants. When the conflagration ceased, the summit of the mountain sunk inwards with such a noise, that all the people in the island believed the last day to be arrived, and prepared for their end by extreme unction. These dreadful disturbances continued through the whole year, more especially in the months of July and August, during which all Sicily was in mourning. The smoke, the noise, and the shocks of the earthquake, affected the whole island; and if Filotes may be believed, who relates this event, many of the Sicilians were struck deaf by the noise. Many structures were demolished; and among others the castle of Corleone, though more than 25 leagues distant from the volcano.

23. During the succeeding 30 years there was no disturbance of this nature. At the end of that space, Sicily was alarmed by a new eruption from the mountain. Etna discharged new streams fire, and covered the adjacent country with volcanic ashes, which entirely ruined the hopes of the husbandman.

24. In the year 1579, Etna renewed its ravages; but no particular account of the damage which it did upon this occasion has been transmitted to us.

25. Twenty-five years had elapsed, when Etna, in the month of June 1603, flamed with new fury. Peter Carrera affirms, that it continued to emit flames for the space of 33 years, till 1636, without interruption, but not always with the same violence. In 1607, the streams of lava which flowed from it destroyed the woods and vineyards on the west side of the mountain. In 1609, they turned their course towards Aderno, and destroyed a part of the forest del Pino, and a part of the wood called *la Sciambrita*, with many vineyards in the district Costerna. Those torrents of lava continued to flow for three months. In the year 1614, a new effort of the subterraneous fire opened another crater, from which fire was discharged on Randazzo, in the district called *il Piro*. The fire continued to flame for 10 or 12 years longer.

26. The same Peter Carrera relates, that a dreadful conflagration happened in the year 1664, of which he himself was witness. It happened on the 13th of December and lasted without interruption, but with different degrees of violence, till the end of May 1678. But in 1679 the inhabitants of Nicolosi were obliged to forsake their houses, which tumbled down soon after they left them. The crater on the summit of Etna had not at this time a threatening aspect, and every thing there continued quiet till the 25th of March: but on the 8th of that month, an hour before night, the air was observed to become dark over the village la Pedara and all that neighbourhood; and the inhabitants of that country thought that an almost total eclipse was taking place. Soon after sun-

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set, frequent shocks of earthquake began to be felt; these were at first weak, but continued till day-break to become more and more terrible. Nicolosi was more affected than any other tract of country on that side of Etna: about noon every house was thrown to the ground; the inhabitants fled in consternation, and invoking the protection of heaven. On the 10th of March a chasm several miles in length, and five or six feet wide opened in the side of the mountain; from which, about two hours before day, there arose a bright light, and a very strong sulphureous exhalation was diffused through the atmosphere.

About 11 in the forenoon of the same day, after dreadful shocks of earthquake, a crater was opened on the hill called *des Noisettes*, from which there issued huge volumes of smoke, not accompanied with fire, ashes, or stones, but with loud and frequent claps of thunder, displaying all the different phenomena with which thunder is at different times attended. And what was very remarkable, the chasm was formed on the south side, between the top and the bottom of the mountain. On the same day another chasm was formed two miles lower, from which issued a great deal of smoke, accompanied with a dreadful noise and earthquake. Towards the evening of the same day, four other chasms were opened towards the south, in the same direction, accompanied during their formation with the same phenomena, and extending all the way to the hill called *la Fusara*.

About 12 paces beyond that, another of the same kind was formed. On the succeeding night, a black smoke, involving a quantity of stones, issued from this last chasm; it discharged at the same time flakes of a dark earth-coloured spongy matter, which became hard after they fell. There issued from the same gulph a stream of lava, which held its course into a lake called *la Hardia*, six miles from Montpelliceri, and on its way thither destroyed many dwelling-houses and other buildings in the neighbouring villages.

On the next day, March 12th, this stream of fire directed its course towards the tract of country called *Malpazzo*, which was inhabited by 800 people; in the space of 20 hours it was entirely depopulated and laid waste. The lava then took a new direction, in which it destroyed some other villages.

The mount of Montpelliceri was next destroyed with all the inhabitants upon it.

On the 23d of the same month the stream of fire was in some places two miles broad. It now attacked the large village of Mazzalucia; and on the same day a vast gulph was formed, from which were discharged sand or ashes, which produced a hill with two summits, two miles in circumference and 150 paces high. It was observed to consist of yellow, white, black, grey, red, and green, stones.

The new mount of Nicolosi continued to emit ashes for the space of three months; and the quantity discharged was so great as to cover all the adjoining tract of country for the space of 15 miles; some of those ashes were conveyed by the winds as far as Messina and Calabria; and a north wind arising, covered all the southern country about Agosta, Lentini, and even beyond that, in the same manner.

While at that height on Nicolosi so many extraordinary appearances were passing, the highest crater

on the summit of Etna still preserved its usual tranquillity.

On the 25th of March, about one in the morning the whole mountain, even to the most elevated peak, was agitated by a most violent earthquake. The highest crater of Etna, which was one of the loftiest parts of the mountain, then sunk into the volcanic focus; and in the place which it had occupied, there now appeared nothing but a wide gulph more than a mile in extent, from which there issued enormous masses of smoke, ashes, and stones. At that period, according to the historian of this event, the famous block of lava on mount Frumento was discharged from the volcanic focus.

In a short time after, the torrent of fire, which still continued to flow, directed its course towards Catania with redoubled noise, and accompanied with a much greater quantity of ashes and burning stones than before. For several months many most alarming shocks of earthquake were felt; and the city was threatened with destruction by the torrent of fire. They in vain attempted to turn or divert its course; the lava rose over the walls, and entered by an angle near the Benedictine convent on the 11th of June following. This awful event is related by Francis Monaco, Charles Mancius, Vincent Auria, and Thomas Thedeschì.

27. Some years after this conflagration, a new burning gulph opened in the month of December 1682 on the summit of the mountain, and spread its lava over the hill of Mezarra.

28. On the 24th of May 1686, about ten in the evening, a new eruption burst out from the summit of the mountain, on the side contiguous to the hill del Bue. Such a quantity of inflamed matter was thrown out as consumed woods, vineyards, and crops of grain for four leagues round. It stopped its course in a large valley near the castle of Mascali. Several people from the neighbourhood had ascended a hill between the wood of Cania and the confines of Cirrità to observe the progress of the lava; but the hill, on a sudden, sunk inwards, and they were buried alive.

29. Etna was now long quiet; for no less a space of time indeed than one half of the present age. In the year 1755 its eruptions were renewed. It opened near mount Lepra, and emitted as usual fire and smoke; after which it remained quiet only for eight years.

30. In the year 1763, there was an eruption which continued three months, but with intervals. Etna was at first heard to rebellow. Flames and clouds of smoke were seen to issue out, sometimes silver-coloured, and at other times, when the rays of the sun fell upon them, of a purple radiance: at length they were carried off by the winds, and rained, as they were driven before them, a shower of fire all the way to Catania and beyond it. An eruption soon burst out; the principal torrent divided into two branches, one of which ran towards the east, and fell into a deep and extensive valley.

The flames which issued from this new crater afforded a noble spectacle. A pyramid of fire was seen to rise to a prodigious height in the air, like a beautiful artificial fire-work, with a constant and formidable battery, which shook the earth under those who were spectators of the scene. Torrents of melted matter running

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running down the sides of the mountain, diffused a light bright as day through the darkness of the night.

At sun-rising the burning lava was observed to have run round some oaks that were still standing unburnt. Their leaves were all withered. Some birds had fallen from their branches, and been burnt to death. Some people cast wood upon the lava, and it was immediately burnt. This lava continued hot, and exhaled smoke for two years. For five years after this, no snow appeared on the summit of Etna.

31. In the year 1764 a new crater was opened at a great distance from the summit of mount Etna.

32. In the year 1766 another was opened at the grotto of Paterno; fire, smoke, and an inconsiderable torrent of lava issued out of it.

33. On the 27th of January 1730 a new opening was formed two miles under the last mentioned crater.

On the 28th of February, and the 14th of March, the earthquake was renewed on the north side, and accompanied with terrible noises.

Between the 6th of April and the 7th of May the convulsions were again renewed, accompanied with noise as before; a quantity of pumice-stones and fine sand was discharged from it.

On the 18th of May the shocks were renewed: on the 23d a new crater was formed on the side of mount Frumento on the summit of Etna; and from it a torrent of lava discharged, which spread through the valley of Laudunza. It was 200 paces in breadth. Two other chinks were opened in the mountain near Paterno, and very near one another. The lava issuing from them proceeded in the space of seven days six miles; on the 25th it had run nine miles.

A new crater was likewise opened on the 25th; from which a quantity of red-hot stones continued to issue for half an hour, and fell at a very great distance: there proceeded likewise from it a stream of lava; which, in the same space of time, ran over a tract of country two miles in extent.

Several parts of those streams of lava were observed to be cool on the surface, and formed into solid masses, but melted again by a new stream of burning lava, which however did not melt the old lava.

34. The last eruption of Etna happened in 1787, as described in the former article *ÆTNA*, p. 222, 223.

ETOLIA, a country of ancient Greece, comprehending all that tract now called the *Despotat*, or *Little Greece*. It was parted on the east by the river Evenus, now the Fidari, from the Locrenses Ozolæ; on the west, from Acarnania by the Achelous; on the north, it bordered on the country of the Dorians and part of Epirus; and, on the south, extended to the bay of Corinth.

The Etolians were a restless and turbulent people; seldom at peace among themselves, and ever at war with their neighbours; utter strangers to all sense of friendship or principle of honour; ready to betray their friends upon the least prospect of reaping any advantage from their treachery: in short, they were looked upon by the other states of Greece no otherwise than as outlaws and public robbers. On the other hand, they were bold and enterprising in war; inured to labour and hardships; and undaunted in the greatest dangers: jealous defenders of their liberties, for which they were on all occasions, willing to venture their

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lives, and sacrifice all that was most dear to them.

They distinguished themselves above all the other nations of Greece, in opposing the ambitious designs of the Macedonian princes; who, after having reduced most of the other states, were forced to grant them a peace upon very honourable terms. The constitution of the Etolian republic was copied from that of the Achæans, and with a view to form, as it were, a counter alliance; for the Etolians bore an irreconcilable hatred to the Achæans, and had conceived no small jealousy at the growing power of that state. The Cleomonic war, and that of the allies, called the *social war*, were kindled by the Etolians in the heart of Peloponnesus, with no other view but to humble their antagonists the Achæans. In the latter, they held out, with the assistance only of the Eleans and Lacedæmonians, for the space of three years, against the united forces of Achæia and Macedon; but were obliged at last to purchase a peace, by yielding up to Philip all Acarnania. As they parted with this province much against their will, they watched all opportunities of wresting it out of the Macedonian's hands; for which reason they entered into an alliance with Rome against him, and proved of great service to the Romans in their war with him: but growing insolent upon account of their services they made war upon the Romans themselves. By that warlike nation they were overcome, and granted a peace on the following severe terms: 1. The majesty of the Roman people shall be revered in all Etolia. 2. Etolia shall not suffer the armies of such as are at war with Rome to pass through her territories, and the enemies of Rome shall be likewise the enemies of Etolia. 3. She shall in the space of 100 days, put into the hands of the magistrates of Corcyra all the prisoners and deserters she has, whether of the Romans or their allies, except such as have been taken twice, or during her alliance with Rome. 4. The Etolians shall pay down in ready money, to the Roman general in Etolia, 200 Euboic talents, of the same value as the Athenian talents, and engage to pay 50 talents more within the six years following. 5. They shall put into the hands of the consul 40 such hostages as he shall choose; none of whom shall be under 12, or above 40 years of age: the pretor, the general of the horse, and of such as have been already hostages at Rome, are excepted out of this number. 6. Etolia shall renounce all pretensions to the cities and territories which the Romans have conquered, though those cities and territories had formerly belonged to the Etolians. 7. The city of Oenis, and its district, shall be subject to the Acarnanians.

After the conquest of Macedon by Paulus Æmilius, they were reduced to a much worse condition; for not only those among them, who had openly declared for Perseus, but such as were only suspected to have favoured him in their hearts, were sent to Rome in order to clear themselves before the senate. There they were detained, and never afterwards suffered to return into their native country. Five hundred and fifty of the chief men of the nation were barbarously assassinated by the partisans of Rome, for no other crime but that of being suspected to wish well to Perseus. The Etolians appeared before Paulus Æmilius in mourning habits, and made loud complaints of such inhuman

Etolia inhuman treatment; but could obtain no redress: nay, ten commissioners, who had been sent by the senate to settle the affairs of Greece, enacted a decree, declaring, that those who were killed had suffered justly, since it appeared to them that they had favoured the Macedonian party. From this time those only were raised to the chief honours and employments in the Etolian republic who were known to prefer the interest of Rome to that of their country; and as these alone were countenanced at Rome, all the magistrates of Etolia were the creatures and mere tools of the Roman senate. In this state of servile subjection they continued till the destruction of Corinth, and the dissolution of the Achaean league; when Etolia, with the other free states of Greece was reduced to a Roman province, commonly called the *province of Achaia*. Nevertheless, each state and city was governed by its own laws under the superintendency of the pretor whom Rome sent annually into Achaia. The whole nation paid a certain tribute, and the rich were forbidden to possess lands any where but in their own country.

In this state, with little alteration, Etolia continued under the emperors, till the reign of Constantine the Great, who, in his new partition of the provinces of the empire, divided the western parts of Greece from the rest, calling them *New Epirus*, and subjecting the whole country to the *praefectus praetorii* for Illyricum. Under the successors of Constantine, Greece was parcelled out into several principalities, especially after the taking of Constantinople by the Western princes. At that time, Theodorus Angelus, a noble Grecian, of the Imperial family, seized on Etolia and Epirus. The former he left to Michael his son; who maintained it against Michael Palaeologus, the first emperor of the Greeks, after the expulsion of the Latins. Charles, the last prince of this family, dying in 1430 without lawful issue, bequeathed Etolia to his brother's son, named also *Charles*; and Acarnania to his natural sons, Memnon, Turnus, and Hercules. But, great disputes arising about this division, Amurath II. after the reduction of Thessalonica, laid hold of so favourable an opportunity, and drove them all out in 1432. The Mahometans were afterwards dispossessed of this country by the famous prince of Epirus, George Castriot, commonly called *Scanderbeg*; who with a small army, opposed the whole power of the Ottoman empire, and defeated those barbarians in 22 pitched battles. That hero, at his death, left great part of Etolia to the Venetians; but, they not being able to make head against such a mighty power, the whole country was soon reduced by Mohammed II. whose successors hold it to this day.

ETRURIA. See HETRURIA.

ETYMOLOGY, that part of grammar which considers and explains the origin and derivation of words, in order to arrive at their first and primary signification, whence Quintilian calls it *originatio*.—The word is formed of the Greek *ετυμολογια* *verus*, "true," and *λεγω* *dico*, "I speak"; whence *λογια* *discourse*, &c. and thence Cicero calls the etymology *notatio* and *veriloquium*; though Quintilian chooses rather to call it *originatio*.

A judicious inquiry into etymologies is thought by some of considerable use; because nations, who value themselves upon their antiquity, have always look-

ed on the antiquity of their language as one of the best titles they could plead; and the etymologist, by seeking the true and original reason of the notions and ideas fixed to each word and expression, may often furnish an argument of antiquity, from the traces remaining thereof, compared with the ancient uses. Add, that etymologies are necessary for the thorough understanding of a language. For, to explain a term precisely, there seems a necessity for recurring to its first imposition, in order to speak justly and satisfactorily thereof. The force and extent of a word is generally better conceived when a person knows its origin and etymology.

It is objected, however, that the art is arbitrary, and built altogether on conjectures and appearances; and the etymologists are charged with deriving their words from where they please. And indeed it is no easy matter to go back into the ancient British and Gaulish ages, and to follow, as it were, by the track, the various imperceptible alterations a language has undergone from age to age; and as those alterations have sometimes been merely owing to caprice, it is easy to take a mere imagination or conjecture for a regular analogy: so that it is no wonder the public should be prejudiced against a science which seems to stand on so precarious a footing. It must certainly be owned, that etymologies are frequently so far fetched, that one can scarce see any resemblance or correspondence therein. Quintilian has shown, that the ancient etymologists, notwithstanding all their learning, fell into very ridiculous derivations.

The etymologies of our English words have been derived from the Saxon, Welch, Walloon, Danish, Latin, Greek, &c.

In the present work the etymologies of words are generally noted, where their obviousness does not render it unnecessary, or their dubiety or unimportance useless.

EVACUANTS, in pharmacy, are properly such medicines as diminish the animal fluids, by throwing out some morbid or redundant humour; or such as thin, attenuate, and promote the motion and circulation thereof.

EVACUATION, in medicine, the art of diminishing, emptying, or attenuating the humours of the body.

EVAGRIUS SCHOLASTICUS, a famous historian, born at Epiphania, about the year 536. He practised the profession of an advocate, from which he was called *Scholasticus*, which name was then given to the pleaders at the bar. He was also tribune and keeper of the prefect's dispatches. He wrote an ecclesiastical history, which begins where Socrates and Theodoret ended theirs; and other works, for which he was rewarded by the emperors Tiberius and Mauricius. M. de Valois published at Paris a good edition of Evagrius's ecclesiastical history, in folio; and it was republished at Cambridge in 1620, in folio, by William Reading, with additional notes of various authors.

EVANDER, a famous Arcadian chief, called the son of Mercury, on account of his eloquence, brought a colony of his people into Italy, about 60 years before the taking of Troy; when Faunus, who then reigned over the Aborigines, gave him a large extent of country, in which he settled with his friends. He is said to have taught the Latins the use of letters, and the art of husbandry. He kindly received Hercules when

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Evander.

Evangelists when he returned from the conquest of Geryon, and he was the first who raised him altars. He gave Æneas assistance against the Rutuli, and distinguished himself by his hospitality. It is said that he first brought the Greek alphabet into Italy, and introduced there the worship of the Greek deities. He was honoured as a God after death, and his subjects raised him an altar on mount Aventine.

**Evapora-
tion.**

AVANGELISTS, the inspired authors of the gospels. The word is derived from the Greek *ευαγγελισται*, formed of *eu bene*, "well," and *αγγελος* "angel or messenger."

The denomination *evangelists* was likewise given in the ancient church to such as preached the gospel up and down, without being attached to any particular church, being either commissioned by the apostles to instruct the nations, or of their own accord abandoning every worldly attachment and consecrating themselves to the sacred office of preaching the gospel. In which sense some interpreters think it is that St Philip, who was one of the seven deacons, is called the *evangelist*, in the 21st chapter of the Acts of the Apostles, ver. 8. Again, St Paul writing to Timothy, Ep. ii. cap. iv. ver. 5. bids him do the work of an evangelist. The same apostle, Eph. iv. 11. ranks the evangelists after the apostles and prophets.

EVANID, a name by some authors to such colours as are of no long duration, as those in the rainbow, in clouds before and after sun-set, &c.

Evanid colours are also called *fantastical* and *emphatical* colours.

EVANTES, in antiquity, the priestesses of Bacchus, thus called, because in celebrating the orgia they ran about as if distracted, crying *Evan, evan, ohé evan*. See **BACCHANALIA**.

EVAPORATION, in natural philosophy, signifies the conversion of fluids, principally water, into vapour, so that it becomes specifically lighter than the atmosphere.

The theory of evaporation, and formation of vapour by the absorption of heat, is fully discussed under the article **CHEMISTRY**; it remains only therefore to take notice of some of the most remarkable phenomena attending it. With regard to water, it is generally allowed that it evaporates in every degree of heat above 32° to 212°, which is its boiling point, when it is dissipated in great quantity, and as fast as possible. It has also been supposed to evaporate even after its conversion into ice; but some late authors have denied this to be the case. Other liquids, such as spirit of wine or ether, continue to evaporate long after they have been cooled down to the freezing point of water; nor is there any experiment by which it has yet been discovered at what degree their evaporation ceases. Even quicksilver, to appearance a much more heavy and sluggish fluid, and which does not boil without applying almost three times the heat necessary to make water boil, is found readily to evaporate when the pressure of the atmosphere is taken off; and hence the empty parts of barometrical tubes, where the instruments were made with great accuracy and the tubes perfectly exhausted, have been covered with mercurial globules, owing to an invisible vapour ascending from the surface of the metal. In like manner the evaporation of water is very sensible in some experiments with the air-pump. Dr Priestely found, that where

moisture was carefully excluded from his apparatus, he was never able to produce such a quantity of inflammable air by heating charcoal as when a little quantity of water was admitted by moistening the leather on which the receiver stood. Nor is the elasticity of this kind of steam altogether imperceptible; for in the barometer abovementioned, the accuracy of the instrument was considerably affected by the steam of the mercury ascending from it, and occupying the void space in the upper part of the glass tube.

Evaporation, according to the experiments of the Abbé Nollet, appears to be promoted by electricity. The conclusions drawn from them are, 1. Electricity augments the natural evaporation of fluids; all that were tried, excepting mercury and oil, being found to suffer a considerable diminution, greater than what could be ascribed to any other cause. 2. Electricity augments the evaporation of those fluids the most which are found most readily to evaporate spontaneously; the volatile spirit of sal-ammoniac suffering a greater loss than spirit of wine or oil of turpentine, these two more than common water, and water more than vinegar or a solution of nitre. 3. The effects seemed always to be greatest when the vessels containing the fluids were non-electrics. 4. The increased evaporation was more considerable when the vessel which contained the liquor was more open; but the effects did not increase in proportion to the apertures. 5. Electricity was also found to increase the evaporation from solid bodies, and of consequence to augment the insensible perspiration of animals.

Evaporation is one of the great natural processes, and by means of it the whole vegetable kingdom is supplied with rain necessary for its support. This evaporation takes place at all times, not only from the surface of the ocean, but of the earth also. Dr Halley, by an experiment with a pan of water kept in the heat of our summer sun, found, that as much water might be reasonably supposed to evaporate from the surface of the Mediterranean sea, as would be sufficient to supply all the rivers which run into it. Dr Watson in his Chemical essays, has shown, that the evaporation is not less considerable from the surface of the land than from that of the sea. By inverting a glass vessel on the ground, in the time of a considerable drought, he found that even then about 1600 gallons of water were raised from an acre in 24 hours; and repeating the experiment after a thunder-shower, he found that in such a state an acre parted with above 1900 gallons of water in 12 hours.

This evaporation is carried on not only from the ground itself, but from the leaves of trees, grass, &c. with which it is covered; and great part of the water thus raised falls down again in the night-time in dew, being absorbed by the same vegetables which yielded it before. Thus the earth is not so soon exhausted of water, even for a little way below the surface as we might be apt to imagine from the quantity raised by evaporation: for if all that was raised by the sun's heat during the time of a long drought, left the earth not to return to it for perhaps five or six weeks, the whole vegetable kingdom, at least such as do not strike their roots very deeply into the ground, must of necessity be destroyed; which yet we see is only the case with the most tender grass, and even that only

**Evapora-
tion.**

**Evapora-
tion pro-
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electricity.**

**Great quan-
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and sea.**

Evapor-
tion.3
Cold pro-
duced by
evapora-
tion.

only on the most elevated situations, and when most exposed to the sun.

Another great use of the natural evaporation is to cool the earth, and to prevent its being too much heated by the sun. This property of producing cold by evaporation has been but lately observed by chemists, though it has long been employed by those who knew not the reason of their doing so. It has been observed at Aleppo in Syria, that the water in their jars is always the coolest when the weather is most warm and the power of the sun excessive. The heats in that part of the world are sometimes almost intolerable; and at that time the evaporation from the outside of the jars, which are made of porous clay, is very copious; and in proportion to the quantity of water evaporated from without, is the degree of cold in the liquor within. The reason of this is easily deduced from what is said under the article CHEMISTRY: where it is shown that vapour is composed of fire and water united together. The consequence of this is, that wherever there is any quantity of latent heat above 32° of Fahrenheit contained in any body, the water in contact with the surface, or contained in the pores of the body, will gradually absorb it, and converting it into latent heat, will thus be rendered specifically lighter than the common atmosphere, and fly off into it. Thus part of the sensible heat of the body will be carried off; and as subsequent quantities of water always fly off with more and more of the sensible heat, it is plain, that by continued evaporation of water almost all the sensible heat above 32° of Fahrenheit will be carried off. If instead of water, spirit of wine be made use of, which continues to evaporate long after it is cooled to 32° , a much greater degree of cold may be produced than by the evaporation of mere water; and if instead of spirit of wine, we make use of ether, which is still more volatile than spirit of wine, an excessive degree of cold, scarcely inferior to that which congeals mercury, may be produced.

This method of producing cold by means of the expensive liquids of ether and spirit of wine, cannot be employed excepting merely for the sake of experiment: but that by the evaporation of water may be applied to very useful purposes in the warm countries; and it has been customary with sailors to cool their casks of liquors by sprinkling them with sea water.

4
Effects of
evapora-
tion on the
human
body.

From the theory of evaporation laid down under the article CHEMISTRY, we may easily see the reason why, in a very warm temperature, animal bodies have the power of producing cold. A vapour, called insensible perspiration, continually issues from the bodies of animals, from human bodies especially, which, carrying off great quantities of their sensible heat, enables them, according to its quantity, to preserve the same temperature in many different degrees of atmospherical heat.

For the same reason also we may see why the continual sprinkling with cold water is so very powerful in depriving the human body of the heat necessary for the support of life, even though the temperature of the water should not be below what can be easily borne. It has already been shown, that by the evaporation of water, a degree of cold not much inferior to that of freezing water may be produced; and consequently, by continual sprinkling of the body with water, the whole might in time be reduced to nearly the degree

of cold in which water freezes. But this is what no human body can bear: and hence we may understand why storms of rain and snow are often fatal; and likewise why, in cases of shipwreck, people have died by being exposed for a few hours to the spray of the sea.

The theory of the evaporation of water laid down under the article CHEMISTRY, furnishes us also with a solution of a very curious phenomenon, inexplicable on any other principle, viz. why melting ice will freeze other pieces together more strongly; and, if a considerable degree of heat is not continued for some time, will again consolidate itself into a much harder mass than before. The fact was discovered by Mr Wedgewood in an attempt to connect his clay thermometer with the common mercurial ones. In this attempt he had occasion to repeat an experiment made by Messrs Lavoisier and de la Place, who had measured the heat of bodies by the quantity of ice they are capable of liquefying. These authors observe, that if ice cooled to any degree below the freezing point, be exposed to a warmer atmosphere, it will be brought up to the freezing point through its whole mass before any part of it begins to liquefy; and that consequently ice, beginning to melt on the surface, will be always exactly at the same temperature, viz. at the freezing point; and that if a heated body be inclosed in a hollow sphere of such ice, the whole of its heat will be occupied in melting it: so that if the ice be defended from external warmth, by surrounding it with other ice in a proper vessel, the weight of the water produced from it will be exactly proportional to the heat which the heated body has lost; or, in other words, will be a true physical measure of the heat. For the experiment, they provide a tin vessel divided by upright concentric partitions into three compartments, one within another. The innermost compartment is a wire-cage for receiving the heated body; the second, surrounding this cage, is filled with pounded ice, to be melted by the heat; and the outermost is filled also with pounded ice, to defend the former from the warmth of the atmosphere. The first of these ice compartments terminates at bottom in a stem like a funnel, through which the water is conveyed off; and the other ice compartment terminates in a separate canal for discharging the water into that ice which is reduced. As soon as the heated body is dropped into the cage, a cover is put on, which goes over both that and the first ice compartment; which cover is itself a kind of shallow vessel filled with pounded ice, with holes in the bottom for permitting the water to pass from this ice into the second compartment; all the liquefaction that happens in both being only the effect of the heated body. Another cover, with pounded ice, is placed over the whole as a defence from external warmth.

Mr Wedgewood began by satisfying himself that ice did really acquire the temperature of 32° throughout its whole substance before it began to melt; but being apprehensive that the pounded ice might imbibe and retain some water among it by capillary attraction, he judged it necessary to attend to this circumstance also. Having therefore pounded some ice, he laid it in a conical heap on a plate; and having at hand some water coloured with cochineal, he poured it gently into the plate at some distance from the heap. It rose hastily to the top, and was retained by the mass as by

Evapora-
tion.5
Curious
phenome-
non with
regard to
melting ice;

Evapora-
tion.

a sponge; nor did any part of it begin to drop till the heat of his hand began to liquefy the mass. He farther observed, that in a conical heap of this kind the water rose two inches and a half in the space of three minutes; and by weighing the water employed, and what remained upon the plate unabsorbed, it appeared that four ounces of ice had taken up and retained one ounce of water. To ascertain this absorbing power of ice more fully, he pressed six ounces of it into a funnel, having first introduced a wooden core, in order to leave a proper cavity in the middle; then taking out the core, and pouring an ounce of water on the ice, he left the whole for half an hour, during which time there ran out only 12 pennyweights and four grains; so that the ice had retained seven pennyweights and 20 grains; nearly one-twelfth of its own weight and two-fifths of the weight of the water.

Being now convinced that it would be proper to use solid ice instead of that which was pounded, he determined to congeal a quantity of water into one mass by a freezing mixture, and then expose it to the atmosphere till it began to liquefy. His apparatus for this purpose is represented Plate CLXXXIX. *A* is a large funnel filled with a solid mass of ice. *B*, a cavity in the middle of this ice, formed part of the way by scraping with a knife, and for the remaining part by boring with a hot iron wire. *C*, one of the thermometer pieces serves for the heated body, and rests on a coil of brass wire: it had been previously burnt with a strong fire, that there might be no danger of its suffering any farther diminution of bulk by being heated again for those experiments. *D*, a cork stopped in the orifice of the funnel. *E*, the exterior vessel, having the space between the sides and its included funnel *A* filled with pounded ice as a defence to the ice in the funnel. *F*, a cover for this exterior vessel, filled with pounded ice for the same purpose. *G*, a cover for the funnel, filled also with pounded ice, with perforations in the bottom for allowing the water to pass from this ice down to the funnel. The thermometer piece was heated in boiling water, taken up with a small pair of tongs equally heated, dropped instantly into the cavity *B*, and the covers put on as expeditiously as possible; the bottom of the funnel being previously corked, that the water might be detained till it should part with all its heat, and likewise to prevent the water from the other ice, which ran down on the outside of the funnel, from mingling with it. After standing about 10 minutes the funnel was taken out, wiped dry, and uncorked over a weighed cup. The water that ran out weighed 22 grains. On repeating the experiment the water weighed only 12 grains; and on a third trial, in which the piece was continued much longer in the cavity, the liquid did not amount to three drops. To his surprise Mr Wedgwood also now found the piece frozen to the ice so that it could not easily be got off, though all the ice was at the beginning of the experiment in a thawing state.

On heating the piece again to 60° of his thermometer (1857 of Fahrenheit), and throwing some fragments of ice over it, he found that in about half an hour the water amounted to 11 pennyweights. On stopping the funnel, replacing the covers, and leaving the whole about seven hours, he found, that a considerable quantity of water was collected; but it ran out so slowly, that he imagined something had stopped the narrow end of the funnel: but on examining the state

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tion.

of the ice, he found that the fragments he had thrown over the thermometer-piece were entirely frozen together, and in such a form that it was evident they could not have assumed it without fresh water having been superadded and thrown upon them, the cavities between them being partly filled with new ice. This was so strongly cemented, that he could scarcely get it out with the point of a knife, and great part of the coiled wire was found enveloped in the new ice. The passage through the ice to the stem of the funnel, which had been made pretty wide with a thick iron wire, was so nearly shut up, that the slow draining of the water was now very easily accounted for; this draining of the water indeed being the only sign of any passage at all. On taking the ice out of the funnel, and breaking it to examine this canal, he found it almost entirely filled up with ice projecting from the solid mass in crystalline forms, similar in appearance to the crystals we often meet with in the cavities of flints and quartzose stones. A coating of ice was also found on the outside of the funnel perfectly transparent, and of a considerable extent, about the $\frac{1}{8}$ th of an inch thick: this coating enveloped also a part of the funnel which was not in contact with the surrounding ice, the latter being melted to the distance of an inch from it. Some of the ice being scraped off from the inside of the funnel and applied to the bulb of the thermometer, the mercury sunk from 50° to 32°, and continued at that point till the ice was melted; after which the water being poured off, it rose in a little time to 47°.

Astonished at these appearances, our author determined to repeat the experiment with some pieces of ice he had stored in a cellar; but on going thither, he found the cask of ice itself in a similar situation to that made use of in his experiments. Though much of it was melted, yet the fragments were frozen together, so that it was with difficulty that any pieces could be broken or got out with an iron spade; and when so broken, it had the appearance of Breccia marble, or plumpudding stone; the fragments having been broken and rammed into the cask with an iron mallet. A porcelain cup being laid upon some of this ice about half an hour, in a room whose temperature was 50°, it was found pretty firmly adhering; and when pulled off, the ice exhibited an exact impression of the fluted part of the cup with which it had been in contact; so that the ice must necessarily have been liquefied first, and afterwards congealed. This was several times repeated with the same event. Fragments of the ice were likewise applied to one another, to sponges, pieces of flannel, and linen cloth, both moist and dry: all those in a few seconds began to cohere; and in about a minute were frozen so as to require some force to separate them. After standing an hour, the cohesion was so firm, that on pulling away the fragments of ice from the woollen and sponge, they tore off with them that part of the surface with which they were in contact; though at the same time both the sponge and flannel were filled with water which that very ice had produced.

The power of the congelation was stronger on the sponge and woollen than on linen; and to estimate its force, a piece of ice was applied to a bit of dry flannel weighing two pennyweights and an half, surrounding them at the same time with other ice. After lying

C

together

Evapora-
tion.

together three quarters of an hour, he found that a weight of five ounces was necessary to separate them, though so much of the ice had liquefied that the weight of the flannel was increased by more than 12 pennyweights. The piece of ice was then weighed, put to the flannel a second time, and left in contact with it for four hours; at the end of which time they were found so firmly frozen together, that 78 ounces were required for their separation, although from 42 pennyweights of the ice 15 more had melted off: the surface of contact was at this time about a square inch. Continuing them in contact for 7 hours longer, they only bore 62 ounces, the ice being diminished to 14 pennyweights, and the surface of contact reduced to about $\frac{1}{4}$ th of an inch square.

6
Water ab-
sorbed by
solid ice.

On trying whether masses of ice apparently solid would absorb water, he found that they did so in considerable quantity; for on heating some of his thermometer pieces, and laying them on pieces of ice, in which they made considerable cavities, he always found the water absorbed as fast as it was produced, leaving both the piece and the cavity dry.

7
Two differ-
ent theo-
ries of this
phenome-
non.

Thus was our author convinced, that, in his experiments, the two seemingly opposite processes of nature, congelation and liquefaction, went on together at the same time, in the same vessel, and even in the same piece of ice. To account for such an extraordinary phenomenon, he had recourse to two different theories. One was, that water, when highly attenuated, and resolved into vapour, may freeze with a less degree of cold than water in its aggregate or grosser form: whence hoar frost is observed on grass, trees, &c. at times when there is no appearance of ice upon water, and when the thermometer is above the freezing point; which seems also to have been the opinion of Boerhaave, as he places the freezing of vapour, or even of water when divided by absorption in a linen cloth, at 33° . "Now (says Mr Wedgewood), as the atmosphere abounds with watery vapour, or water dissolved and chemically combined, and must be particularly loaded with it in the neighbourhood of melting ice; as the heated body introduced into the funnel must necessarily convert a portion of the ice or water into vapour; and as ice is known to melt as soon as the heat begins to exceed 32° , or nearly one degree lower than the freezing point of vapour; I think we may from hence deduce pretty satisfactorily all the phenomena I have observed. For it naturally follows from these principles, that vapour may freeze where ice is melting; that the vapour may congeal, even upon the surface of melting ice itself; and that the heat which, according to the ingenious theory of Dr Black, it emits in freezing, may contribute to the further liquefaction of that very ice upon which the new congelation is formed.

"I would further observe, that the freezing of water is attended with plentiful evaporation in a close as well as in an open vessel; the vapour in the former condensing into drops on the under side of the cover, which either continue in the form of water, or assume that of ice or a kind of snow, according to circumstances; which evaporation may perhaps be attributed to the heat, that was combined with the water, at this moment rapidly making its escape, and carrying part of the aqueous fluid off with it. We are hence furnished with a fresh and continual source of vapour

as well as heat: so that the processes of liquefaction and congelation may go on uninterruptedly together, and even necessarily accompany one another; although, as the freezing must be in an under proportion to the melting, the whole of the ice must ultimately be consumed.

"Some other circumstances may be taken notice of in the coating of ice on the outside of the throat of the funnel. Neither the cover of the outer vessel, nor the aperture in its bottom which the stem of the funnel passed through, were air-tight; and the melting of the surrounding ice had left a vacancy about an inch round that part of the funnel on which the crust had formed. As there was therefore a passage for air through the vessel, a circulation of it would probably take place; the cold and dense air in the vessel would descend into the rarer air of the room, then about 50° , and be replaced by air from above. The effect of this circulation and sudden refrigeration of the air will be a condensation of part of the moisture it contains upon the bodies it is in contact with; the throat of the funnel being one of these bodies, must receive its share; and the degree of cold in which the ice thaws being supposed sufficient for the freezing of this moist vapour, the contact, condensation, and freezing, may happen at the same instant. The same principles apply to every instance of condensation that took place in these experiments; and the congelation was evidently strongest in those circumstances where vapour was most abundant, and on those bodies which from their natural or mechanic structure were capacious of the greatest quantity of it; stronger, for instance, on sponge than on woollen, stronger on this than on the closer texture of linen, and far stronger on all of these than on the compact surface of porcelain."

The second theory proposed by our author for solving the phenomena in question is founded entirely on the principles of evaporation. "If nevertheless (says he) the principle I have assumed, that water highly attenuated will congeal with a less degree of cold than water in the mass, should not be admitted; another has above been hinted at, which experiments have decidedly established, from which the phenomena may perhaps be equally accounted for, and which, even though the other also is received, must be supposed to concur for some part of the effect: I mean that evaporation produces cold; both vapour and steam carrying off some proportion of heat from the body which produces them. If therefore evaporation be made to take place upon the surface of ice, the contiguous ice will thereby be rendered colder; and as it is already at the freezing point, the smallest increase of cold will be sufficient for fresh congelation. If ice is producible by evaporation in the East Indies*, where natural ice is never seen, we need not wonder that congelation should take place where the same principle operates amidst actual ice.

Evapora-
tion.* See Con-
gelation.

"It has been observed above, that the heat emitted by the congealing vapour probably unites with and liquefies contiguous portions of ice: but whether the whole, either of the heat so emitted, or of that originally introduced into the funnel, is thus taken up; how often it may unite with other portions of ice, and be driven out from other new congelations; whether there exists any difference in its chemical affinity or elective attraction to water in different states and the

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Evasion
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Euchites.

contiguous bodies; whether part of it may not ultimately escape, without performing the office expected from it upon the ice; and to what distance from the evaporating surface the refrigerating power may extend, must be left for further experiments to determine."

EVASION, in law, is used for any subtle endeavour to set aside truth, or to escape the punishment of the law, which will not be endured. This, if a person says to another that he will not strike him, but will give him a pot of ale to strike him first, and accordingly he strikes, the returning of it is punishable; and if the person first striking be killed, it is murder; for no man shall evade the justice of the law by such a pretence to cover his malice.

EVATES, a branch or division of the druids, or ancient Celtic philosophers. Strabo divides the British ancient Gaulish philosophers into three sects; bards, evates, and druids. He adds, that the bards were the poets and musicians; the evates, the priests and naturalists; and the druids were moralists as well as naturalists: But Marcellus and Hornius reduce them all to two sects, viz. the BARDS and DRUIDS.

EUBAGES, an order of priests or philosophers among the ancient Celtæ or Gauls: some will have the eubages to be the same with the druids and saronidæ of Diodorus; and others, that they were the same with what Strabo calls EVATES.

EUBOEA (anc. geog.), an oblong island, stretching out between Attica and Thessaly, opposite to Boeotia; from which it is separated by a narrow strait called *Euripus*. This island, never exceeding 40, nor ever falling short of two miles in breadth, is in length 150 miles, and in compass 365, according to Pliny. Now NEGROPONT, from its principal town, which was anciently called *Chalcis*.

EUCCHARIST, the sacrament of the Lord's supper, properly signifies *giving thanks*. The word in its original Greek *Εὐχαριστία*, literally imports *thanksgiving*; being formed of *εὖ*, bene, "well," and *χαρὶν*, gratia, "thanks."

This sacrament was instituted by Christ himself, and the participation of it is called *communion*.

As to the manner of celebrating the eucharist among the ancient Christians, after the customary oblations were made, the deacon brought water to the bishops and presbyters, standing round the table, to wash their hands; according to that of the psalmist, "I will wash my hands in innocency, and so will I compass thy altar, O Lord." Then the deacon cried out aloud, "Mutually embrace and kiss each other;" which being done, the whole congregation prayed for the universal peace and welfare of the church, for the tranquillity and repose of the world, for the prosperity of the age, for wholesome weather, and for all ranks and degrees of men. After this followed mutual salutations of the minister and people; and then the bishop or presbyter having sanctified the elements by a solemn benediction, he brake the bread, and delivered it to the deacon, who distributed it to the communicants, and after that the cup. Their sacramental wine was usually diluted or mixed with water. During the time of administration, they sang hymns and psalms; and having concluded with prayer and thanksgiving, the people saluted each other with a kiss of peace, and so the assembly broke up.

EUCHITES, or EUCHITÆ, a sect of ancient he-

retics, who were first formed into a religious body towards the end of the fourth century, though their doctrine and discipline subsisted in Syria, Egypt, and other eastern countries before the birth of Christ; they were thus called because they prayed without ceasing, imagining that prayer alone was sufficient to save them. Their great foundation were those words of St Paul, (Thessalonians v. 17.), *Pray without ceasing*. The word is formed of the Greek, *ευχῆ* prayer, whence *ευχισταί*, the same with the Latin, *precatores*, "prayers." They were also called *Enthusiasts* and *Messalians*; a term of Hebrew origin, denoting the same as Euchites.

The Euchites were a sort of mystics who imagined, according to the oriental notion, that two souls resided in man, the one good and the other evil; and who were zealous in expelling the evil soul or dæmon, and hastening the return of the good spirit of God, by contemplation, prayer, and singing of hymns. They also embraced the opinions nearly resembling the Manichean doctrine, and which they derived from the tenets of the oriental philosophy. The same denomination was used in the 12th century, to denote certain fanatics who infested the Greek and Eastern churches, and who were charged with believing a double Trinity, rejecting wedlock, abstaining from flesh, treating with contempt the sacraments of baptism and the Lord's supper, and the various branches of external worship, and placing the essence of religion solely in external prayer, and maintaining the efficacy of perpetual supplications to the supreme Being for expelling an evil being or genius, which dwelt in the breast of every mortal. This sect is said to have been founded by a person called *Lucopetrus*, whose chief disciple was named *Tychicus*. By degrees it became a general and invidious appellation for persons of eminent piety and zeal for genuine Christianity, who opposed the vicious practices and insolent tyranny of the priesthood; much in the same manner as the Latins comprehended all the adversaries of the Roman pontiff under the general terms of WALDENSES and ALBIGENSES.

St Cyril of Alexandria, in one of his letters, takes occasion to censure several monks in Egypt, who, under pretence of resigning themselves wholly to prayer, led a lazy, scandalous life. A censure likewise applicable to monasteries in general.

EUCHOLOGIUM, *Εὐχολόγιον*, a Greek term, signifying literally *a discourse on prayer*. The word is formed of *ευχῆ* prayer, and *λόγος* discourse.

The Euchologium is properly the Greek ritual, wherein are prescribed the order and manner of every thing relating to the order and administration of their ceremonies, sacraments, ordinations, &c.

F. Goar has given us an edition of the Greek Euchologium in Greek and Latin, with notes, at Paris.

EUCLID of MEGARA, a celebrated philosopher and logician, flourished about 400 B. C. The Athenians having prohibited the Megarians from entering their city on pain of death; this philosopher disguised himself in women's clothes to attend the lectures of Socrates. After the death of Socrates, Plato and other philosophers went to Euclid at Megara, to shelter themselves from the tyrants who governed Athens. Euclid admitted but one chief good; which he sometimes called *God*, sometimes *Spirit*, and sometimes *Providence*.

EUCLID of Alexandria, the celebrated mathematician,

Euchites
||
Euclid.

Eucrasy,
Eudiometer.

cian, flourished in the reign of Ptolemy Lagus, about 277. B. C. He reduced all the fundamental principles of pure mathematics, which had been delivered down by Thales, Pythagoras, Eudoxus, and other mathematicians, before him, into regularity and order, and added many others of his own discovering; on which account he is said to be the first who reduced arithmetic and geometry into the form of a science. He likewise applied himself to the study of mixed mathematics, and especially to astronomy, in which he also excelled. The most celebrated of his works is his Elements of Geometry, of which there have been a great number of editions in all languages; and a fine edition of all his works was printed in 1703, by David Gregory, Savilian professor of astronomy at Oxford.

EUCRASY, (of *eu* well, and *crasis* temperature), in medicine, an agreeable well proportioned mixture of qualities, whereby a body is said to be in good order and disposed for a good state of health.

EUDIOMETER, an instrument for observing the purity of the atmospherical air, or the quantity of pure dephlogisticated or vital air contained in it, chiefly by means of its diminution on a mixture with nitrous air*. Several kinds of these have been invented, the principal of which are the following.

* See Aerology, no 60, 154.

1
Dr Priestley's eudiometer.

I. The eudiometer originally used by Dr Priestley is a divided glass tube, into which, after having filled it with common water, and inverted it into the same, one or more measures of common air, and an equal quantity of the nitrous kind, are introduced by means of a small phial, which is called the *measure*; and thus the diminution of the volume of the mixture, which is seen at once by means of the graduations of the tube, instantly discovers the purity of the air required.

2
Landriani's eudiometer.

II. The discovery of this property of nitrous air and the eudiometer by Dr Priestley, soon produced various attempts to improve on the principle, and construct more elegant and accurate machines for discovering the smallest inequality in the constitution of the atmosphere. The first of these was contrived by Mr Landriani; an account of which is published in the sixth volume of M. Rosier's Journal for the year 1775. It consists of a glass tube, fitted by grinding to a cylindrical vessel, to which are joined two glass cocks and a small basin; the whole being fitted to a wooden frame. Quicksilver is used in this instrument instead of water; but the use of that fluid occasions an inconvenience, because the nitrous air acts upon the metal, and renders the experiment ambiguous.

3
Inconvenience attending its use.

4
Magellan's first eudiometer.

III. In 1777 Mr Magellan published an account of three eudiometers invented by himself. The first of these, represented Plate CLXXXVI. fig. 1. consists of a glass tube *MD*, about 12 or 15 inches long, and quite cylindrical throughout, having the upper orifice closed with a ground-glass stopple *M*. A vessel *C* is joined to the lower part of the tube, and likewise well adapted by grinding. This vessel has three necks, as represented in the figure: one of which serves to join it to the tube *M*; the other two are ground to those of the phials *A* and *B*, whose capacities must be as equal as possible, as well to each other as to the tube *MD*. *Z* represents a brass ring which slides up and down the tube *MD*, and by a finger-screw may be tightened or slackened at pleasure, and set to any place upon it. *G* is a brass or wooden ruler divided into

equal parts, with two semicircular brass pieces, by which it may easily be applied and kept near the glass tube *MD*, as is shown at *F*; where it must be kept close to the neck, or upper extremity of the tube, by the notch *I*. In using this instrument, we must first remove the stopple *M*, after which the instrument is to be entirely filled with water by dipping it in the tub. The stopple is then to be replaced; taking care that no bubble of air may remain either in the tube, the vessel *C*, or the two phials *A B*. The lower part of the instrument, viz. about as far as the middle of the tube, must then be kept under water, and one of the phials *A* or *B*, now filled with water, is to be removed from the neck of the vessel *C*, and filled with the air of which we design to try the purity, in the manner directed under the article *GAS*; after which it is to be replaced into the neck of the vessel *C*; and in like manner the other phial must be filled with nitrous air, and replaced in the other neck. Taking the instrument then out of the water, the vessel *C* must be turned with the bottom upwards, as represented at *F*; in which case, the two elastic fluids contained in the phials will ascend into the vessel *C*; where, mixing together, the diminution will be affected. But as soon as the vessel is turned round the instrument must be plunged in water as far as about the middle of the tube, and the stopple *M* removed. As the bulk of the two elastic fluids diminishes, the water in the tube *MD* descends. This instrument is subject to some errors, arising from the greater or lesser height of the column of water in the tube *MD*, as it is held more or less perpendicular; it may also vary by the very act of putting in the stopple *M*. Another and still greater fault is, that it cannot admit but one measure of nitrous to one of common air, which is a very uncertain method of estimating the purity of a given kind of respirable air. The divisions on the scale are likewise too large, and it does not seem capable of any great accuracy.

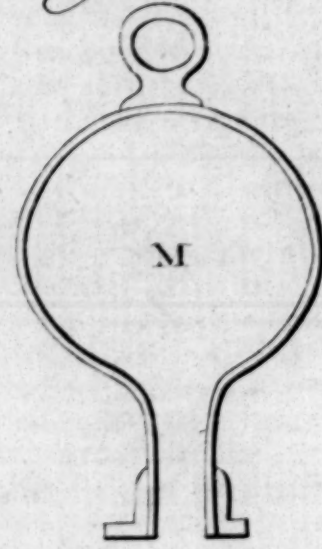
5
Inaccuracy of this instrument.

The second kind of eudiometer constructed by M. His second Magellan is represented fig. 2. and consists of a glass tube *TC*, two or three feet long, and having a cavity as nearly cylindrical as possible. One of the ends, *C* is bent forwards as represented in the figure; the other at *T* is open, and may terminate in a funnel, to obviate the necessity of using a separate one. The whole tube is fastened by means of two loops to the brass scale *CWN*. *N* is a glass phial, having its neck *V* ground air-tight to the inside of the end of the tube *T*; the whole phial containing one half of what the tube *TC* is capable of containing; but the phial *ABC*, at the other end, must contain three or four times the quantity that *N* can contain; and the neck of it must also be ground air-tight to the end *C* of the tube. The scale *CWTV* is divided into 128 parts, the divisions being set from *T* towards *C*; and the cavity of the tube between the first and last of them being double the capacity of the phial *N*. *XR* is a tin vessel, which may serve as a case for packing the whole instrument and its appendages; as also for a trough for holding water when experiments are to be made. The glass tube *g h*, and the glass stopple *M*, are both ground air-tight to the mouth *V* of the tube, in order to be put into it occasionally. To use this kind of eudiometer, let the instrument be immersed under water in the tin vessel;

6

His second eudiometer.

Plate CXXXI.





Eudiometer.

vessel; then let the phial *N*, when filled with water, be put into *CED*, the inside socket of the tin-vessel. Fill it then with nitrous air; and let this quantity be thrown into the phial *ABC*, which is to be fixed somewhat tight to the mouth *C* of the eudiometer. The same phial *N* is afterwards filled with the air of which we wish to try the quality; and raising the end of the instrument *C*, it is then put into the mouth *V*. The instrument is then to be placed upright as in the figure, by hanging it on the hook *W*; and as soon as this last air goes up to the phial *ABC*, the phial *N* is to be taken off, that the diminution of the two mixed airs may be supplied from the water in the tin-vessel: the mouth *V* of the eudiometer being all this time held under water. The bent tube *gh* having the brass ring *K* fitted to it, is then put to the lower end *V* of the eudiometer. By observing the surface of the water in the small tube, which thus forms a true syphon with the tube of the instrument, and by means of the brass ring *K*, the stationary state of diminution in the mixture may be distinguished; which being ascertained, the small tube *gh* is taken off from the eudiometer, and the whole instrument laid down for some minutes in the water of the tin-vessel; after which the mouth *V* is to be shut up with the glass-stopple *M*; and, reversing the instrument, it is hanged up by the end *V* upon the hook *W*. By this position the whole diminished air of the vessel *ABC* goes up to the top, where its real bulk is shown by the scale facing the inside surface of the water. This number being deducted from 128, gives the comparative wholesomeness of the air already tried without any farther calculation. But this process (says Mr Magellan) will be still easier, when the last diminution of the two kinds of air is only required in the observation: because no use will then be made of the syphon. In such a case the instrument is left hanging on the hook *W* for 48 hours; after which it is laid down under the water of the trough in an horizontal position for 8 or 12 minutes, in order to acquire the same temperature with the water: the mouth *V* is then shut up with the stopple *M*; the instrument is hung by the end *V* in a contrary position; and the last real bulk of the good mixed air will then be shown by the number of the brass scales answering to the inside surface of the water.

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His third
eudiometer.

IV. The third eudiometer constructed by Mr Magellan is represented fig. 3. where *EN* represents an uniformly cylindrical glass-tube about two or three feet long, with a large ball *S* and a glass stopple *M*, fitted air-tight to the mouth *N*, which ought to be wide and funnel-shaped, unless a separate funnel is made use of. *KL* is a small syphon with a brass ring *X*; *Z* a small phial, the contents of which do not exceed one third of the ball *S*, or one-half of the glass-tube. Lastly, the instrument has a ruler *I*, divided and stamped like the scale already mentioned, with a glass funnel, which is ground to the mouth *N* of the instrument, when this is not funnel-shaped as above directed. When this eudiometer is to be made use of, it must be filled with water, and set in a vertical position, with

the mouth *V* under the surface of the water in a tub or trough. The phial *Z* is to be filled with nitrous air, and thrown into the tube by means of a glass-funnel, if the mouth of the eudiometer tube be not sufficiently wide to answer the purpose. The same phial *Z* is then to be filled with the air to be tried; after which the syphon *KL* is to be immediately added to the mouth *N* of the eudiometer under the surface of the water, some of which is to be poured into it. The stationary moment of the greatest diminution of the two airs is watched by means of the ring *X*; and, when that moment arrives, the syphon *KL* is to be taken off; the eudiometer is laid for some minutes under water in an horizontal position or nearly so; but taking care that none of the inclosed air may escape: the mouth *N* is then shut up with the glass-stopple *M*, and the instrument is inverted with the mouth *N* upwards. Lastly, the space occupied by the residuum of the diminished air is measured by applying to its side the divided ruler or scale, and the result is estimated as has been already explained.

Eudiometer.

On all these eudiometers it is very obvious to remark, that they are complicated and difficult to be used; and it is besides no easy matter to get them made with the requisite accuracy. Mr Cavallo observes also, that the construction of all the three is founded on a supposition that the mixture of nitrous and atmospherical air, after having continued for some time to diminish, increases again; but he informs us that this is a mistake, and that Mr Magellan himself owned it to be so. But the worst of all is, that they are by no means accurate, as appeared from several experiments made by Mr Magellan in Mr Cavallo's presence, with air taken out of the window of the room where the experiments were performed. By the first trial, the diminution was 48 parts out of 132 of the mixture: on a second trial, the same elastic fluids being still used, the diminution was 58 parts out of 132: on a third trial, the diminution was again 48; and by a fourth one, it was 51. Nay, Mr Magellan himself owned that, after many experiments with his eudiometers, he never could obtain any constant result, even when the nitrous and common air which he made use of were precisely of the same quality.

V. A preferable method of discovering the purity of the air by means of an eudiometer is recommended by M. Fontana; of which Mr Cavallo says, that its accuracy is such as could scarce be believed by those who have not had an opportunity of observing it. The instrument is originally nothing more than a divided glass tube, though the inventor afterwards added to it a complicated apparatus, which, in Cavallo's opinion, was altogether useless. The first simple eudiometer consisted simply of a glass tube, as uniformly cylindrical as possible in its cavity, about 18 inches long, and $\frac{3}{4}$ ths of an inch in diameter in the inside, hermetically sealed at one end (A). The outside of this tube was marked with a diamond, or had circles drawn round it at the distance of three inches from one another, beginning at the close end of the tube; or at such distances

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Fontana's
eudiometer.

(A) To observe whether the cavity of a glass tube is perfectly cylindrical, pour into it at different times equal quantities of mercury or water, one upon the other; observing each time, by means of a divided ruler, if those equal quantities of liquor fill equal lengths of the tube.

Eudiometer.

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His instrument for measuring a quantity of air exactly.

stances as are exactly filled by equal measures of elastic fluids. When the parts of these divisions were required, the edge of a ruler, divided into inches and smaller parts, was held against the tube; so that the first division of the ruler might coincide with one of the marks on the tube. The nitrous and atmospherical air are introduced into this tube, in order to be diminished, and the purity of the atmospheric air thus ascertained; but that an equal quantity of elastic fluid may always be certainly introduced, M. Fontana contrived the following instrument as a measure, which cannot be liable to any error. It is represented figure 4. and consists of a glass tube *AB*, about two inches long and one in diameter, closed at the end *A*, and having a brass piece *BCDE* cemented on the other, containing a sliding door *D*: which when pushed into its proper cavity, shuts the mouth of the tube or measure *AB*; and when pulled out, as represented in the figure, opens it. To prevent it from being pulled out entirely, a spring *E* is screwed upon the flat part of the brass piece, the extremity of which bears upon the head of a brass pin, which passing through a hole, rubs against the door *D*; and when this is pulled nearly out, the pin, falling into a small cavity, prevents it from coming quite out. The diameter of the brass piece is nearly the same with that of the glass tube *AB*: and near its mouth *C* there are two notches made with a file.

Under the same figure the cavity of the brass piece and the parts of the measure are shown separately, viz. *a*, the glass tube; *b*, the brass piece; *c*, the sliding brass door inverted in such a manner as to exhibit the cavity for the pin; *d*, the pin with the spring and small screw. The inside surface of this measure, as well as of the long tube, should have the polish taken off by rubbing with emery; as this prevents the water, when the experiments are made, from adhering to it in drops, and thus the measurements will be more exact.

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Method of using this eudiometer.

To use this apparatus, the long tube must be filled with water; and being inverted in the tub of water described under the article *Gas*, furnished with a shelf, the measure, being also filled with water, is inverted over an hole in the shelf; and in order to fill it with the elastic fluid required, a phial containing it is brought under the hole; where being inclined a little, part of the gas escapes and passes into the measure. The water then escapes through the notches *ss*, made with the file in the mouth of the measure, as already mentioned (*B*). The door of the measure is then shut by pushing it in as far as it will go; and the measure, being drawn off from the shelf, but still kept under water, is turned with the mouth upwards; by which means the superfluous quantity of elastic fluid, remaining in the cavity of the brass piece by reason of its being separated by the sliding piece, escapes, and has its place occupied by water. The measure being then again inverted with its mouth downwards, is set any where on the shelf of the tub; the long tube put over the hole of the shelf, and the air transferred from the measure to this tube, as has already been directed for filling the measure itself.

When M. Fontana made use of this eudiometer, he commonly threw in two measures of respirable air into the tube; then he added one measure of nitrous air: but as soon as the latter was entered, he removed the tube from the shelf, holding it by the upper end, and agitating it for about 20 seconds in the water. The tube was then rested upon the side of the tub, while the measure was again filled with nitrous air; then putting the tube upon the shelf, and holding it as nearly perpendicular as he could, he applied the divided edge of the ruler to it, in order to observe the diminution of the two fluids. After this he threw in a fourth measure of nitrous air; and after shaking and letting it rest for some time, he observed again the diminution of the two elastic acids.

"That this method (says Mr Cavallo) should be very accurate, may perhaps appear somewhat mysterious; but the mystery will soon vanish, if it be considered that the accurate result depended not so much on the particular construction of the instrument, as on the regular management of it and uniformity of the operation. The exactness of the measure indeed contributed a great deal; but M. Fontana observed, that with exactly the same quantities of nitrous and common air, very different results could be occasioned by their being left a longer or shorter time before the instrument was agitated, or by being agitated much or little, as well as several other circumstances, which to a superficial observer would appear to be of little consequence. He therefore performed the operation always in a similar manner, viz. by agitating the tube always for the same length of time, and always with equal quickness; by which means, when the same elastic fluids were used, the results of the experiments were so nearly the same, that the difference, if any could be observed, might be neglected without any impropriety."

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Why this eudiometer is so accurate.

Notwithstanding the accuracy of this instrument, however, M. Fontana found that it was still liable to some small errors arising from the following sources. 1. The elastic fluid within the tube, when the greatest part of it is filled with water, and the tube is kept out of the water excepting its mouth, is not of the same density with the outward or atmospheric air, on account of the pillar of water in the tube; which, according as it is longer or shorter, counterbalances more or less the pressure of the atmosphere upon the quantity of elastic fluid contained in the upper part of the tube; which quantity of elastic fluid of consequence occupies a greater or lesser space in the tube, according to the greater or less pressure it endures. This error, however, becomes insensible when the column of water is very short, and the surface of the water on the outside coincides nearly with that on the inside of the tube. 2. The difficulty of keeping the instrument perpendicular in the act of measuring the diminution. And, 3. The still greater difficulty of observing with what division of the ruler the surface of the water within the tube coincided.

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Is still liable to some small errors.

To avoid these errors, M. Fontana made use of the following contrivance. *AAAA*, fig. 5. represents a method of strong glass tube about 3 inches diameter, and 18 inches

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Fontana's method of avoiding these errors.

(B) The measure would be filled with elastic fluid though these notches were not made, but not so readily, because the water could not easily get out.

Eudiometer.

inches long, with a foot of glass all made of one piece. Within about an inch of the mouth of this tube a brass ring is fastened, which contains two brass rings moveable upon opposite centres, in the same manner that sea-compasses are usually suspended, and which are commonly called *gingles*. *CCCC* represents the measuring tube or eudiometer; which is exactly the same with that already described, having lines marked upon its outside surface to show the spaces occupied by equal measures of elastic fluid. The scale *BB* is adapted to this tube, which is shewn separately in fig. 6. It consists of two brass slips *AC*, *AC*, connected by two brass rings, *AA*, *CC*, through which the eudiometer tube passes. To the lowest of these rings a perforated brass piece *BB*, furnished with cross pins or pivots, is screwed; and by means of longitudinal cuts, its lower extremity is rendered springy; so that when all the piece *AB*, *AB* is put upon the eudiometer tube, the latter cannot slip from within the former, unless the operator forces it. When the eudiometer tube, with the scale, &c. is put together, as represented fig. 5. the cross pins of the piece *BB*, fig. 6. rest upon the inner ring of the gingle at *AA*, fig. 5. by which means the tube *CCCC*, is kept perpendicular within the tube *AAAA*, provided this latter be situated so nearly perpendicular that the former may not touch the side of it, which would prevent it from acquiring the position desired. One of the brass slips *AC*, fig. 6. is divided into equal parts; 100 of which are equivalent to the space between two of the marks on the eudiometer tube *CCCC*, fig. 5. and consequently show the parts of a measure. These divisions are numbered from the upper edge of the lower ring connecting the two brass slips, *AC*, *AC*.

When this instrument is to be used, one or more measures of respirable air are thrown into the eudiometer tube; a measure of nitrous air is then added; and after shaking the tube for some time, it must be introduced into the large tube *AAAA*, which for this purpose must be plunged into the water of the tub; for the mouth of the eudiometer tube must not at present be taken out of the water. After it has been introduced into the large tube, the whole is taken out of the water, and set upon the shelf or a table. Now the large tube *AAAA* is filled with water, and the eudiometer tube suspended perpendicularly in it by means of the cross pins or pivots of the brass piece annexed to the scale, which rests upon the inner ring of the gingle. The operator must then slide the tube *CCCC* up and down through the scale and brass piece, &c. till the surface of the water within the tube coincides exactly with the upper edge of the lower ring that connects the two brass slips of the scale piece, which may be done very accurately by means of a magnifying glass. The surface of the water within the eudiometer is concave; and when viewed horizontally, it appears like a dark line or limit exceedingly well defined; so that the middle or lowermost point of it may be made to coincide with the edge of the brass ring with great precision, except when some drops of water hang on the outside of the tube, which should therefore be wiped off.

Having ascertained this point, we must next observe which division of the scale coincides with one of the circular divisions marked upon the glass tube *CCCC*,

which will show the parts of a measure. Thus suppose, that when the eudiometer tube is fixed, so that the surface of the water in it coincides perfectly with the edge of the lower brass ring, viz. with the beginning of the divisions; that the 70th division of the scale falls upon the first circular mark, as represented in the figure; then it is plain, that the quantity of elastic fluid contained in the tube is equal to one measure and 70 hundredth parts more. This being observed, and the large tube again immersed in the water, the eudiometer-tube is removed from it, but always taking care that its mouth be not lifted up above the surface of the water. Another measure of nitrous air must now be introduced into the eudiometer-tube; which, after being agitated as already directed, is to be put into the large tube *AAAA*. The whole is then taken out of the water, and the diminution of the elastic fluid observed as above directed.

Thus the eudiometer tube is kept quite perpendicular, and the pillar of water in it rendered very short, not exceeding half an inch at most. It is easy to perceive, however, that if the operator, when furnished with the eudiometer-tube only, keeps it so far immersed in the water of the tube when he observes the divisions, that the water within the tube may be nearly equal with the edge of the tub; the large tube *AAAA* may be spared, and the operation will thus become much more easy and expeditious. Little difference can happen from the position of the tube; because the brass ring ascertains the position of the water so well, and the difference occasioned by a few degrees deviation from the true perpendicular is so small, that it can scarce be perceived.

VI. M. Saffure of Geneva has invented an eudiometer, which he supposes to be more exact than any of those hitherto described. His apparatus consists of the following parts. 1. A cylindrical glass bottle with a ground stopple, capable of containing about five ounces and an half, and which serves as a receiver for mixing the two airs. 2. A small glass phial, whose capacity is nearly equal to one third of that of the recipient, and serves for a measure. 3. A small pair of scales which may weigh very exactly. 4. Several glass bottles for containing the nitrous or other air to be used, and which may supply the place of the recipient when broken. The whole of this apparatus may be easily packed into a box, and thus transported from place to place, and even to the summits of very high mountains. The method of using it is as follows.

1. The receiver is to be filled with water, closed exactly with its glass stopper, wiped on the outside, and weighed very exactly. Being then immersed in a vessel full of water, and held with the mouth downwards, the stopple is removed, and, by means of a funnel, two measures of common and one of nitrous air are introduced into it one after another: these diminish as soon as they come into contact; in consequence of which the water enters the recipient in proportionable quantity. After being stopped and well shaken, to promote the diminution the receiver is to be opened under water; then stopped and shaken, and so on for three times successively. At last the bottle is stopped under water, taken out, wiped very clean and dry, and weighed exactly as before. It is plain, that now when the bottle is filled partly with elastic fluid and partly with

Eudiometer.

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M. Saffure's eudiometer.

Eudiometer.

with water, it must be lighter than when quite full of water; the weight of it then being subtracted from the former, the remainder shows that quantity of water which would fill the space occupied by the diminished elastic fluid. Now, in making experiments with airs of different degrees of purity, the abovementioned remainder will be greater when the diminution is less, or when the air is more impure, and *vice versa*; and thus the comparative purity between two different kinds of airs may be determined.

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Inconveniences and errors to which this machine is liable.

On this method it is obvious to remark, that notwithstanding the encomiums bestowed on it by the inventor, it is subject to many inconveniences and errors, principally arising from the inaccuracy of the measure, and the difficulty of stopping the bottle without occasioning a pressure, upon the contained elastic fluid, which being variable, must occasion some error in the weight of the bottle.

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Mr Cavallo's eudiometer.

VII. To avoid the inconveniences to which all these instruments are subject, Mr Cavallo employed a glass tube with its scale and measure, such as is represented fig. 5. the length of the tube being about 16 or 17 inches, and between $\frac{1}{4}$ and $\frac{1}{2}$ of an inch in diameter, and of as equal a bore as possible throughout, having one end sealed hermetically, and the other shaped like a funnel, though not very wide. The whole of this apparatus is represented fig. 7. where *AB* is the glass tube, to the upper end of which a loop *AEC* should be fastened, made of waxed silk-lace, with several cross threads *CG*, *DD*, *EE*, &c. in order to suspend the instrument to a hook *AB*, fig. 8. which should either be fastened to that side of the tube opposite to the shelf, or so constructed that it may be easily fixed and removed again as occasion requires; or it may be made of thick brass wire, the lower extremity of which fits a hole made in the side of the tub. The brass piece with the scale, which slides upon the eudiometer, is formed of two brass slips *FG*, *HI* (fig. 7.), joined by two brass rings, to which they are soldered. One hundred divisions are marked upon one of those brass slips, beginning from the upper edge of the lower ring *GI*, and all together equal to the space contained between two of the marks or measures made upon the glass tube; so that they show the parts of a measure. An hundred divisions are likewise marked upon the other brass slip *HI*, beginning from the lower edge of the upper ring *FH*.—The following directions are given by Mr Cavallo for marking these divisions. "When the tube *AB* is filled with water, a measure of air should be thrown into it in the manner already directed: the tube must then be suspended to the hook by the loop, as represented fig. 8, so high, that the surface of the water within the tube may be very near the surface of the water in the tub, two inches, for instance, above it; then looking horizontally through the tube, a mark should be made by sticking a bit of soft wax upon the tube, just coinciding with the lower part of the surface of the water within it; in which place afterwards a circular mark should be made with the edge of a flint, or with a piece of agate or diamond, but not so deep as to endanger the breaking of the tube. Thus the first measure is marked; and in like manner may any other one be marked. The attentive practitioner, however, should never venture to mark the tube with an indelible stroke after one trial, lest

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he should be mistaken. The proper method is to mark them first with wax, and then repeat the operation once or twice, in order to correct some errors that might escape the first time; after which the mark may be made with a diamond, flint, or perhaps more conveniently with a file. The polish of the inside of both tube and measure should be taken off with emery; which is a very labourious operation, though it is particularly necessary that the measure should be done in this manner."

To use this eudiometer, fill the tube with water, taking care that no bubbles of air remain in it; and inverting it with the mouth downwards, leave it in the water leaning against the side of the tub. Fill the measure then with the elastic fluid whose purity is to be tried. Put the eudiometer tube upon the shelf of the tub, keeping it perpendicular, and with the mouth exactly upon the hole of the shelf, and throw the measure of air into it; fill it again with the same air, and throw this likewise into the tube. Then fill it with nitrous air, and throw this also into the tube, which must be shaken immediately after the operation by moving it alternately up and down in the water of the tub for about a quarter of a minute. It is then left a short time at rest and suspended by the hook formerly mentioned, so that the surface of the water in the inside may be about two inches above that in the tub; when the brass scale is slid upon it till the upper edge of the lower ring coincide with the middle part of the surface of the water within the tube, and then we may observe which division of the scale coincides with any of those on the tube; by which means the quantity of elastic fluid remaining in the tube may be clearly seen, even to the hundredth-part of a measure. The following directions are given by our author for noting down the results in a clear and accurate manner.

"1. The two measures first introduced into the tube are expressed by a Roman number; after which the single measure of nitrous air is expressed by another Roman number; and the measures, with the parts of a measure, remaining in the tube after diminution, are expressed by common numbers with decimals. Thus, suppose, that after introducing two measures of common and one of nitrous air, and after shaking in the manner above directed, the quantity of fluid remaining in the eudiometer is such, that when the upper edge of the lower ring of the scale coincides with the lower point of the surface of the water in the tube, the 56th division of the scale falls against the second circular division on the tube, then this diminution is marked thus II. I, 2,56; signifying that two measures of common and one of nitrous air, after diminution by being mixed together, occupy the space of two measures and 56th hundredth parts of a measure.—Lastly, after marking the first diminution, throw a second measure of nitrous air into the tube; shake the instrument; and after a little rest, observe this second diminution; which, supposing it to have reduced the whole bulk to three measures and seven hundredth-parts, is thus marked down, II, II, 3,07. Sometimes one, two, or three measures of nitrous air must still be added, in order to observe the diminution of some very pure species of respirable air. The divisions which begin from the upper ring of the scale-piece of the eudiometer are useful when the quantity of elastic fluid

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Eudiometer.

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Method of using it.

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Method of noting down the results of the experiments.

Eudiometer.

contained in is so small, that the edge of the lower brass ring cannot be raised so high as to coincide with the edge of the water within the tube on account of the silk loop: in which case the under edge of the upper ring is brought to that point; and we must then observe which of those divisions coincides with the first circular division upon the tube. If it be asked, Why the two or more measures of nitrous air are not thrown into the tube all at once, and the last diminution noted? the answer is, That in this method, the effects of similar experiments have not been found equally uniform with those tried in the abovementioned manner.

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Precautions necessary to be observed in making the experiments.

2. "In this operation care should be taken to shake the tube immediately after the nitrous air has been thrown into it, and to leave it at rest afterwards for some time; otherwise the results of similar experiments are far from being alike. It is also necessary to observe, that by holding the measure or the eudiometer tube with the hand, which is warmer than the water of the tub, the elastic fluid undergoes some degree of rarefaction, so that the event of the experiments may often be rendered precarious. For this reason the instruments should be held only with the extremities of the fingers and thumb; and before the door of the measure be shut, or the point of the scale on the eudiometer tube be fixed, those instruments should be left a short time by themselves, keeping the hands and breath at a sufficient distance from them."

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Phenomena to be observed in experiments of this kind.

The following are some particulars necessary to be observed in making experiments of this kind.

1. When respirable air is mixed with nitrous air, their joint bulk is diminished, and the diminution is greater when the air is purer, *ceteris paribus*, and *vice versa*.

2. On mixing the two airs together all at once, the ensuing diminution is greater than if the same quantity of nitrous air be added to an equal quantity of respirable air at different times: and hence it follows, that the quicker the two sorts of elastic fluids are mixed together, the greater is the diminution, and contrarywise.

3. Nitrous air of different quality occasions a different degree of diminution with respirable air; and therefore care should be taken to use such materials as afford air always of the same quality. The most proper substance for this purpose is very pure quicksilver; a quarter of an ounce, or even less, with a proper quantity of diluted nitrous acid, will produce a great deal of nitrous air, which is always of the same quality, provided the metal be always of equal purity; but with other metals, as brass, copper, &c. the nitrous air made at one time is often different from that made at another, and therefore occasions a greater or less diminution when mixed with common air though precisely of the same sort.

4. The quality of nitrous air is impaired by keeping, especially when in contact with water; and for this reason it ought to be prepared fresh every two or three days.

5. In performing these experiments, it should be carefully remarked, that no mistakes arise from heat or cold; as the elastic fluids are easily contracted or expanded, by any variation of temperature.

6. Though the greatest diminution takes place immediately after mixing the respirable and nitrous airs

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together, especially when they are agitated, yet they continue to diminish a little for some time after; for which reason the diminution should be observed always at a certain time after the mixture is made. The whole process indeed ought always to be performed in an uniform manner, otherwise the results will be frequently very dissimilar.

Eudiometer.

7. It must be remarked, that the surface of the water which lies contiguous to the elastic fluid contained in a small vessel, is very far from being a plane, or even from being always of a similar figure in the same vessel, on account of the attraction or repulsion between the substance of the glass and water. This is altered by many circumstances, particularly by the adhesion of extraneous bodies; whence it is very improper to use common open phials for this purpose. We must also take into consideration the drops of water adhering to the sides of the vessel, and the quality of the water in which the operation is performed.

8. In case the experiment is to take up some hours, in order to observe the last diminution, it will be proper to notice, by a good barometer, if the gravity of the atmosphere has suffered any alteration during that time; for a difference in its pressure may occasion some difference in the result of the experiments.

9. A simple apparatus is always to be preferred to a more complicated one, even though the latter should appear to have some advantage over it in point of accuracy. Complex machines are not only expensive, and subject to be easily put out of order, but occasion frequent mistakes, on account of the operator having generally many things to do and keep in proper order; whence it is easy to overlook some of them.

It has already been remarked, that one source of error in the experiments made with eudiometers is the inequality of the column of water in the tube by which the mixture of elastic fluids is confined. For example, if a cubic inch of air, taken near the apparatus where the experiment is to be performed, be introduced into a long tube previously filled and inverted in water, so that the surface of the water in the tube may be 20 inches higher than that in the basin, the air in the upper part will then be found to occupy a considerably larger space than if the column of water was shorter; because in the former case the pressure of the water in the tube partly counterbalances the pressure of the atmosphere, so that the latter is less able to resist the elasticity of the confined air. The difference will be much greater if quicksilver be made use of instead of water, as the weight of that fluid is much greater than that of water. To avoid this, it has been directed to manage matters so that the surface of the fluid on the outside may nearly correspond with that in the inside of the tube; but this is sometimes impracticable, especially where quicksilver is used, with which the error is more considerable than with water: in such cases, therefore, we must have recourse to calculation, and deduce the real quantity of elastic fluid from the apparent space it occupies in a receiver, which is partly filled with it and partly with water or some other gross fluid. For this purpose it must be remembered, that the spaces into which air or any other elastic fluid is contracted, are to one another in the inverse ratio of the pressures which confine these elastic fluids; hence the space occupied by a quantity of elastic fluid *AB*, (fig. 9.)

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Of the sources of error in this kind of experiments.

D

confined

Eudiometer.

confined in the tube *AC* inverted in quicksilver, and filled with it as far as *B*, is to the space which the same quantity of fluid occupies out of the tube, as the pressure which acts upon it when out of the tube is to the pressure which acts upon it in the tube; that is, as the height of the barometer, to the same height of the barometer deducting the height *BC* of the quicksilver in the tube. Thus, suppose that the length *AB* of the tube occupied by an elastic fluid is three inches, and that the length *BC*, filled with quicksilver, is 20 inches; it is required to determine the length of the same tube, which the same quantity of elastic fluid would occupy if the surface of the quicksilver in the basin was brought even with *B*. viz. if the said elastic fluid was only acted upon by the pressure of the atmosphere. First observe the height of the barometer at that time, which suppose to be 30 inches; then say, As the height of the barometer is to the same height deducting the height of the quicksilver *CB* in the inverted tube *AB*; so is the space *AB* to the real space required: that is, $30 : 30 - 20 :: 3 : \frac{3 \times 30 - 20}{30}$

$= 1$: so that one inch is the length of the tube *AC* which the quantity of elastic fluid *AB* would occupy, if the surface *B* of the quicksilver in it was brought even with that of the quicksilver in the basin. Here, however, we must suppose the tube *AC* to be perfectly cylindrical; otherwise the calculation would become very intricate by being adapted to the form of the vessel.

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Mr Cavendish's eudiometer.

VIII. In the 73d volume of the Philosophical Transactions, we have an account of a new eudiometer by Mr Cavendish. He prefers the Abbe Fontana's to all the rest: the great improvement in which (he says) is, that as the tube is long and narrow, and the orifice of the funnel not much less than the bore of the tube, and the measure made to deliver its contents very quick, the air rises slowly up the tube in one continued column; so that there is time to take the tube off the funnel, and to shake it before the airs come quite into contact; by which means the diminution is much greater and more certain than it would otherwise be. Thus, if equal measures of nitrous and common air are mixed together in this manner, the bulk of the mixture will, in general, be about one measure; but if the airs are suffered to remain in contact about a quarter of a minute before they are shaken, the bulk will hardly be less than one measure and one fifth; and it will be very different according to the length of time they are suffered to remain before they are shaken. In like manner, if, through any fault in the apparatus, the air rises in bubbles, as in that case it is impossible to shake the tube soon enough, the diminution is always less than it ought to be. Another very considerable advantage arising from the method of mixing the airs just mentioned is, that the diminution takes place in its full extent almost instantly; but if they are allowed to remain for some time in contact before they are shaken, the mixture will continue diminishing for many hours.

24
Why Fontana's method excels the rest so much.

The reason of these differences, according to our author, is, that, in the Abbe Fontana's method, the water is shaken briskly up and down in the tube while the airs are mixing; by which means every small portion of nitrous air must be in contact with water ei-

ther at the instant it mixes with the common air, or at least immediately after; and it seems that the water, by absorbing the nitrous acid the moment it is formed, greatly contributes to the quickness of the diminution, as well as to the quantity of it. Hence Mr Cavendish was induced to try whether the diminution would not be more certain and regular, if one of the airs were added to the other slowly and in small bubbles, the vessel being kept shaking all the while that the mixture was made: and on trial he found that this method fully answered his expectations.

The apparatus used by our author is, 1. a cylindrical glass vessel *A* (fig. 10.), with brass caps at top and bottom. To the upper cap a brass cock *B* is fitted: the bottom cap is open, but made to fit close into the brass socket *Dd*, and is fixed into it in the same manner as a bayonet is on a musket. This socket has a small hole *E* in its bottom, and is fastened to the board of the tub by the bent brass *FfG*, in such a manner that *b*, the top of the cock may be about half an inch under water: consequently, if the vessel *A* is placed in its socket with any quantity of air in it, and the cock is then opened, the air will run out by the cock; but will do so very slowly, as it can escape no faster than the water can enter by the small hole *E* to supply its place.

2. Besides this vessel, there are three glass bottles like *M*, fig. 11. having each a flat brass cap at bottom to make it stand steady, and a ring at top to suspend it; also some glass measures of different sizes, as *B* fig. 12. having a flat brass cap at bottom with a wooden handle. These are filled with the air to be measured, then set upon the brass knob *C* fitted to the board of the tub below the surface of the water, which drives out some of the air leaving only the proper quantity.

In mixing the airs together, our author commonly adds the respirable slowly to the nitrous; to do which, a proper quantity of nitrous gas is put into the bottle *M*, by means of one of the measures already described, and another quantity of respirable air is put into the vessel *A*, by first filling it with this air, and then putting it on the knob *C*, as was done by the measure; after which the vessel *A*, is fixed in the socket, and the bottle *M* placed with its mouth over the cock. The quantities of air made use of, and the diminution of the mixture, are determined by weighing the vessels under water in the following manner. From one end of a balance, placed in such a manner as to hang over the tub of water, a forked wire is suspended, to each end of which fork is fixed a fine copper wire; and in trying the experiment, the vessel *A*, with the respirable air in it, is first weighed by suspending it from one of those copper wires, so that it may remain entirely under water. The bottle *M*, with the proper quantity of nitrous air in it, is then hung in the same manner on the other wire, and the weight of both together determined. The air is then let out of the vessel *A* into the bottle *M*, and the weight of both vessels together found a second time; by which we know the diminution of bulk the airs suffer on being mixed. Lastly, the bottle *M* is taken off, and the vessel *A* weighed again by itself, which gives the quantity of respirable air made use of. It is needless to determine the quantity of nitrous air by weight; because, as the quantity

Eudiometer.

25
Advantage of adding one of the airs slowly to the others.

26
Mr Cavendish's apparatus described.

27
His method of mixing the airs, &c.

Fig. 10, 11.

Eudiometer.

quantity used is always sufficient to produce a full diminution, a small difference therein makes no sensible one in the diminution. No sensible error can arise from any difference in the specific gravity of the air; for the thing found by weighing the vessel is the difference of weight of the included air and an equal bulk of water: which, as air is no less than 800 times lighter than water; is very nearly equal to the weight of a quantity of water equal in bulk to the included air. A common balance is not convenient for weighing the bottles under water, without some addition to it: for the lower the vessel of air sinks under water, the more the air is compressed; which makes the vessel heavier, and thereby causes that end of the beam to preponderate. Hence we must either have the index placed below the beam, as in many essay-balances; or by some other means remove the centre of gravity of the beam so much below the centre of suspension, as to make the balance vibrate, notwithstanding the tendency which the compressibility of the air in the vessel has to prevent it.

In this manner of determining the quantities of the air by weight, care must be taken to proportion the lengths of the copper wires in such a manner that the surface of the water in *A* and *M* shall be on the same level, when both have the usual quantity of air in them; as otherwise some errors will arise from the air being more compressed in one than the other. This precaution, indeed, does not entirely take away the error, as the level of the water in *M* is not the same after the airs are mixed that it was before; but in vessels of the size used by our author, this error could never be equal to the 500th part of the whole; which therefore is quite inconsiderable: but even if it was much greater, it could be of no consequence, as it would always be the same in trying the same kind of air.

The vessel *A* (fig. 10) used in these experiments, holds 282 grains of water, and is the quantity denominated *one measure* by our author. There are three bottles for making the mixture, with a measure *B* (fig. 12.) for the nitrous air adapted to each. The first of these holds three measures, and the corresponding measure one and one-fourth of the former measure; the second bottle holds six, and the corresponding measure $2\frac{1}{2}$; the third holds 12, and the corresponding measure five. The first bottle and measure are made use of in trying common air, and the others for the dephlogisticated or purer kinds. As the same quantity of respirable air is always made use of, $1\frac{1}{2}$ measure of nitrous air is added to one of the common atmospherical kind; and in trying very pure dephlogisticated air, five measures of the nitrous kind are made use of; and our author is of opinion, that there is no kind of air so pure as to require a greater quantity of nitrous air. The way by which it is known whether a sufficient quantity of nitrous air has been added, is to observe the bulk of the mixture; for if that is not less than one measure, that is, than the respirable air alone, it is a sign that the quantity of nitrous air is sufficient, or that it will produce the proper diminution, unless it be very impure. It must be observed, however, that though the quantity of respirable air will always be nearly the same, as being put in by measure, yet the observed diminution will commonly require some correction. For example, suppose that the observed diminution was 2.353 measures, and that the

Eudiometer.

quantity of respirable air was found to be .985 of a measure; then the observed diminution must be increased by .035, in order to have the true diminution, or that which would have been produced if the respirable air made use of had been exactly one measure; whence the true diminution is 2.388.

In weighing common air, our author somewhat abridges the process above described. He does not weigh the vessel *A*, but only the bottle *M* with the nitrous air in it; then mixes the airs, and again weighs the same bottle with the mixture in it, and finds the increase of weight; which added to one measure, is very nearly the true diminution whether the quantity of common air made use of was a little more or a little less than one measure. The reason of this is, that as the diminution produced by the mixture of common and nitrous air is only a little greater than the bulk of the common air, the bulk of the mixture will be very nearly the same whether the bulk of the common air be a little greater or a little less than one measure. Let us suppose, for example, that the quantity of common air made use of is exactly one measure, and that the diminution of bulk on mixing is 1.08 of a measure; then must the increase of the weight of the bottle *M*, on adding the common air, be .08 of a measure. Let us next suppose that the quantity of common air made use of is 1.02 of a measure; then will the diminution, on adding the nitrous air, be $1.08 + \frac{1.02}{1.00}$ or 1.1016 of

a measure; and consequently the increase of the weight of the bottle *M* will be $1.1016 - 1.02$, or .0816 of a measure, almost exactly the same as if precisely one measure of common air had been made use of.

The same bottle is made use of, viz. that which holds three measures, when the nitrous is added to the respirable air. In this experiment the bottle *M* is first weighed without any air in it, and then weighed again when full of respirable air, which gives the quantity of the latter made use of. The nitrous air is then put into the vessel *A*, and weighed together with the bottle *M*; after which, having mixed them together, the diminution takes place, and they are weighed again, in order to discover its quantity. In this method a smaller quantity of nitrous air is necessary than in the former. In the first method, it was found that the diminution was scarce sensibly less when one measure of nitrous air was used than with a much larger quantity; so that one measure may be accounted fully sufficient. Our author, however, chose to employ $1\frac{1}{2}$ measure, lest the nitrous air should be impure. There was no sensible diminution whether the orifice of the vessel *A* opening into the bottle *M* was $\frac{1}{8}$ or $\frac{1}{4}$ th of an inch; that is, whether the air escaped in small or large bubbles: the diminution was rather greater when the bottle was shaken briskly than otherwise; but all the difference that could be perceived between these two methods of shaking did not exceed .01 of a measure. The diminution, however, was remarkably less when the bottle was not shaken at all; being at first only 0.9; in about three minutes it increased to 0.93; and after being shaken for about a minute, it increased to 0.99; but when gently shaken at first, the diminution was 1.08 on mixing, and did not sensibly increase after that time. Some difference was found to arise from the length of time the air took up in passing from one vessel

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Of adding
the nitrous
to the re-
spirable.

Eudiometer.

29
Variations
arising
from the
size of the
bottles and
quality of
the water.

30
Attempt
to remedy
the incon-
veniences
from the
different
quality of
the water.

to another. When it took up 80 seconds, for instance, in passing from the one bottle into the other, there was a difference of 5 hundredth-parts more than when it took up only 22 seconds, and about 2 hundredth parts more than when it took up 45 seconds; but at other times the difference was less. As the hole in the plate *Dd*, however, was always the same in our author's experiments, the time taken up by the air in passing from one vessel into the other varied so little that no perceptible difference could arise from that cause. A greater difference arose from the size of the bottles and quality of the water made use of. When the small bottle, holding three measures, was used, and filled with distilled water, the diminution of common air was usually 1.08; but when the bottle was filled with water from the tub, it was .05 less. Using the bottle which held 12 measures, and filled with distilled water, the diminution was about 1.15; and with the same bottle filled with water from the tub it was usually 1.08. "The reason of this (says Mr Cavendish) is, that water has the power of absorbing a small quantity of nitrous air; and the more dephlogisticated the water is, the more of this air it can absorb. If the water is of such a nature also as to froth or form bubbles on letting in the common air, the diminution is remarkably less than in other water. In general the diminution was nearly as great with rain as with distilled water; but sometimes the former would froth a good deal: in which case it was no better than water fouled with oak-shavings. This difference of diminution, according to the nature of the water, is a very great inconvenience, and seems to be the chief cause of uncertainty in trying the purity of the air; but it is by no means peculiar to this method, being equally great in that of Fontana's. In his method indeed it makes little difference whether the water be disposed to froth or not; but this is no great advantage, as it is easy to find water which will not froth; though it shews plainly how little any of the experiments hitherto made on the purity of air can be depended upon." The best method of obviating this inconvenience is to be always careful to use the same kind of water: our author always made use of distilled water; but found that even this was sometimes endowed with a greater power of absorbing nitrous air than at others: and with a view to remedy this, he made the following experiment. Some distilled water being purged of its air by boiling, one part was kept for a week in a bottle with dephlogisticated air, and frequently shaken; the other part being treated in the same manner with phlogisticated air. By a mean of three different trials the test of common air tried with the first of these waters was 1.139; the diminution suffered by shaking nitrous air in it for two seconds being about 0.285. The test of the same air tried with the other water was 1.054, and the diminution by nitrous air only 0.09; the heat of the water in the tub and of the distilled waters being 45°. The heat of the water in the tub and the distilled waters was then raised to 67°; when the test of the same air tried by the first water was 1.100, and by the latter 1.044; the diminution of nitrous air with the first water being 0.235; by the latter 0.089. Hence it might seem that the observed test ought to be corrected by the subtraction of $\frac{1}{4}$ ths of the diminution which nitrous air suffers by being shaken in the water, and adding .002 for every three degrees of heat above 0;

but though this correction will undoubtedly diminish the error, he is of opinion that it will not by any means take it away entirely; and from some circumstances it appears that distilled water possesses a property of absorbing different quantities of nitrous air independent of its heat.

In the second method, viz. when the nitrous acid is added to the common air the diminution is considerably less than in the other; the reason of which is, that when nitrous and common air are mixed together, the former is deprived of part of its phlogiston, and is thereby converted into phlogisticated nitrous acid, and in that state is absorbed by the water; besides that the common air is phlogisticated, and thereby diminished: so that the whole diminution on mixing is equal to the bulk of nitrous air which is turned into acid, added to the diminution which the common air suffers by being phlogisticated. Now it appears, that when a small quantity of nitrous air comes in contact with a large one of common air, the former is more completely deprived of its phlogiston, and absorbed by the water in a more dephlogisticated state than when a small quantity of common air comes into contact with a large quantity of nitrous: in the second method, therefore, where small portions of nitrous air come in contact with a large quantity of common air, the former as has been just observed, is more deprived of its phlogiston; and therefore a smaller quantity of it is required to phlogisticate the common air than in the former method where small portions of common air come in contact with a large quantity of nitrous air; so that a less quantity of the nitrous air is absorbed in the second method than in the first. The common air most probably suffers an equal diminution in both cases.

Another proof that a smaller quantity of nitrous air is required in this method than the former is, that if common air be mixed with a quantity of nitrous air not sufficient to phlogisticate it, the mixture will be more phlogisticated if the nitrous be added slowly to the common air without being in contact with water; the mixture will be found to be still more phlogisticated than in the second method where the two airs are in contact with water at the time of mixing. The final result of Mr Cavendish's experiments on this subject is, that nitrous air used in the first method does not phlogisticate common air more than three-fourths of the same quantity used in the second way; and not so much as one half of the quantity used in the third way, viz. by adding the nitrous air slowly to the other, without being in contact with water.

With respect to the quality of nitrous air used in these experiments, our author observes that it may vary in two respects. 1. In purity; that is, in being more or less mixed with phlogisticated or other air. 2. In two parcels of equally pure air, it is possible that one parcel may contain more phlogiston than the other. A difference in the second respect will cause an error in the test, in whatever proportion it be mixed with the respirable air; but if it differs in the first respect, it will scarcely cause any error unless it be uncommonly impure; provided care is taken to use a quantity sufficient to make a full diminution. It must be observed, however, that if the nitrous air be mixed with fixed air, an error will be occasioned, because part of the latter is absorbed while the test is trying; but this will hardly be

Eudiometer.

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Why the
diminution
is less when
the nitrous
is added to
the respi-
rable air.

32
Conclu-
sions from
Mr Caven-
dish's expe-
riments.

33
Of the dif-
ferent pro-
perties of
nitrous air.

Eudiometer,
Eudocia.

be the case, unless either the metal from which it is procured be covered with rust, or unless the water in which it is received contain much calcareous earth suspended by fixed air; as in that case, if any of the nitrous acid comes over with the air, it will dissolve the calcareous earth, and separate some fixed air.

To determine whether it be possible for nitrous air to differ in the second respect, our author procured some from quicksilver, copper, brass, and iron: in making experiments with which, he found that the difference between the test tried with the three first kinds of air was not greater than what might proceed from the error of the experiment; but those with the air from iron .015 greater than the rest. From other experiments it appeared that the nitrous air from iron was not only more impure than that from other metals, but that the pure portion it contained had less phlogiston in it than that from copper or quicksilver. He is of opinion, however, that copper affords nitrous air sufficiently pure for experiments of this kind without having recourse to quicksilver, as Mr Cavallo advises.

In some of his experiments, Mr Cavendish had occasion to use a larger apparatus, which is represented fig. 13. *A* represents a bottle containing nitrous air inverted into the tub of water *DE*. *B* is bottled fitted with a bent glass tube *C*. This bottle is to be filled with common air without any water, and is first slightly warmed by the hand: the end of the glass tube is then put into the bottle of nitrous air as represented in the figure. As the bottle *B* cools, a little nitrous air runs into it, which instantly loses its elasticity in consequence of coming into contact with the atmospherical air. This condensation occasions an influx of fresh nitrous air, and so on till the whole is exhausted. By this means the nitrous air is added slowly to the other without coming into contact with water, the whole of it has run out from the bottle *A* into *B*; after which the water flows in to supply the vacancy occasioned by the diminution.

EUDOSIA, (ATHENIA, before her conversion to Christianity), a celebrated lady, the daughter of Leontius, philosopher of Athens; who gave her such a learned education, that at his death, he left her only a small legacy, saying she was capable to make her own fortune; but pleading at Athens without success against her two brothers, for a share in her father's estate, she carried her cause personally by appeal to Constantinople; recommended herself to Pulcheria, the sister of the emperor Theodosius the younger; embraced Christianity, was baptized by the name of *Eudocia*, and soon after married to the emperor. Their union lasted a considerable time: but a difference at last taking place, on account of the emperor's jealousy excited by Chrysapius the eunuch, she retired to Jerusalem, where she spent many years in building and adorning churches and in relieving the poor. Dupin says, that she did not return thence till after the emperor's death: but Cave tells us, that she was reconciled to him, returned to Constantinople, and continued with him till his death; after which she went again to Palestine, where she spent the remainder of her life in pious works. She died in the year 460, according to Dupin; or 459, according to Cave: the latter observes, that on her death bed she took a solemn oath, by which she declared herself entirely free from any stains of un-

chastity. She was the author of a paraphrase on the eight first books of the Old Testament in heroic verse; and of a great number of poems, which are lost.

EUDOXIANS, a party or sect of heretics in the fourth century, so denominated from their leader Eudoxius, patriarch of Antioch and Constantinople, a great defender of the Arian doctrine. The Eudoxians adhered to the errors of the Arians and Eunomians, maintaining, that the Son was created out of nothing; that he had a will distinct and different from that of the Father, &c.

EVE. See ADAM.

EVE, the mother of all mankind; who being deluded by the serpent, occasioned the fall, and all its dismal consequences. See ADAM.

EVELYN (John), a most learned and ingenious writer and natural philosopher, was born at Wotton in Surry, the seat of his father, in 1620. After making the tour of Europe, he returned to England about the year 1651, and lived very retired at his rural retreat, Say's Court, near Deptford in Kent; where his disgust at the violence and confusion of the times operated so far upon his studious disposition, that he actually proposed to Mr Boyle the establishing a kind of college for persons of the same turn of mind, where they might associate together without care or interruption. It was owing to Mr Evelyn's gratitude to the place of his education, that Oxford became possessed of the famous Arundelian marbles; which he persuaded the Lord Henry Howard to bestow on that university. He was very assiduous in transmitting to the royal society whatever fell within the compass of his enquiries; and used humbly to style himself *a pioneer in the service*. When the number of books he published is considered, the many he left behind him unfinished and unpublished, and the variety of subjects on which he employed his time, his industry and application are astonishing. "His life (says the honourable Mr Walpole) was a course of inquiry, study, curiosity, instruction, and benevolence. The works of the Creator, and the mimic labours of the creature, were all objects of his pursuit. He unfolded the perfections of the one, and assisted the imperfections of the other. He adored from examination; was a courtier that flattered only by informing his prince, and by pointing out what was worthy for him to countenance; and was really the neighbour of the Gospel, for there was no man that might not have been the better for him. He was one of the first promoters of the royal society, a patron of the ingenious and indigent, and particularly serviceable to the lettered world; for, besides his writings and discoveries he obtained the Arundelian marbles for the university of Oxford, and the Arundelian library for the royal society: nor is it the least part of his praise, that he who proposed to Mr Boyle the election of a philosophic college for retired and speculative persons, had the honesty to write in defence of active life against Sir George Mackenzie's Essay on Solitude. He knew that retirement in his own hands was industry and benefit to mankind; but in those of others, laziness and inutility." There are five small prints of this gentleman's journey from Rome to Naples, drawn and etched by him; and among his published works are, 1. A Character of England; 2. The State of France; 3. An Essay on the first book of Lucretius *De rerum natura*; 4. The French

Eudoxians
Evelyn.

Evergetus
Eugene.

French gardener; 5. A Panegyric on King Charles II's coronation; 6. *Fumifugum*, or the inconveniences of the air and smoke of London dissipated; 7. The History and Art of Engraving on Copper; 8. A parallel between the ancient architecture and the modern; 9. *Sylva*, or a discourse of forests-trees; and several others. This amiable gentleman died, full of age and honour, in 1706. His son John Evelyn, born in 1654, distinguished himself by his elegant translations and poems: He was one of the commissioners of the revenue in Ireland; but died early in life, in 1698.

EVERGETES, a surname signifying *benefactor*, given to Philip of Macedonia, and to Antigonus Dofon, and Ptolemy of Egypt. It was also commonly given to the kings of Syria and Pontus, and we often see among the former an Alexander Evergetes, and among the latter a Mithridates Evergetes. Some of the Roman emperors also claimed that epithet of Benevolent and Humane.

EVERGREEN, in gardening, a species of perennials, which continue their verdure, leaves, &c. all the year: such are hollies, phillyreas, lauristinuses, bays, pines, firs, cedars of Lebanon, &c.

EVERLASTING PEA. See LYTHYRUS.

EVES DROPPERS. See *EAVES-Droppers*.

EVESHAM, or EVESHOLM, commonly called *E-fam*, a town of Worcestershire, seated on a gentle ascent from the river Avon, over which there is a bridge of seven arches. It is 95 miles from London, 14 miles from Worcester, and has a harbour for barges. It is an old borough, reckoned the second in the county; and sends two members to parliament. It had formerly an abbey with a mitred abbot; which abbey when standing was one of the largest and most stately of any in the kingdom. It was governed by a bailiff, till king James I. at the request of his son Prince Henry, gave it a charter for a mayor, 7 aldermen, 12 capital burgesses, a recorder, and chamberlain, who are all of the common council, with 24 other burgesses called assistants. Four of the aldermen, and the mayor for the time being, are justices of the peace; and of oyer and terminer, and of goal delivery, for all offences in the corporation, except high treason; and the corporation, has power to try and execute felons within the borough. Here are two parish-churches; but the bells of both have been removed to a beautiful old tower which was one of the gates of the abbey. This town is noted for the great victory obtained near it by Prince Edward, afterwards King Edward I. over Simon Montford, the great earl of Leicester, who was killed in the battle. There is an open prospect from hence of the spacious valley called the *vale of Evesham* or *vale of Gloucester*, which so abounds with the best of corn, as well as pasture for sheep, that is reckoned the granary of all these parts. The vale runs all along the banks of the Avon, from Tewkesbury to Pershore, and to Stratford in Warwickshire, and the river is so far navigable. It has a weekly market and four fairs. The market-house built by Sir Edward Hobby has its upper apartments used by the corporation for a sessions-house, and formerly for the assizes of the county. There are considerable garden-grounds around the place, the produce of which supplies the adjacent towns.

EUGENE (Francis), prince of Savoy, descended from Carignan, one of the three branches of the house

of Savoy, and son of Eugene Maurice, general of the Swiss and Grisons, governor of Campagne, and earl of Soissons, was born in 1663. Louis XIV. to whom he became afterwards so formidable an enemy, thought him so unpromising a youth, that he refused him preferment both in the church and the state, thinking him too much addicted to pleasure to be useful in either. Prince Eugene, in disgust, quitted France; and, retiring to Vienna, devoted himself to the imperial service. The war between the emperor and the Turks afforded the first opportunity of exerting his military talents; and every campaign proved a new step in his advancement to the highest offices in the army. He gave the Turks a memorable defeat at Zenta; commanded the German forces in Italy, where he foiled marshal Villeroy in every engagement, and at length took him prisoner. Our limits do not allow a detail of his campaigns; but prince Eugene distinguished himself greatly, when the emperor and queen Anne united against the exorbitant power of Louis XIV. He died at Vienna in the year 1736; and was as remarkable for his modesty and liberality, as for his abilities in the field and the cabinet.

EUGENIA, the YAMBOO: A genus of the monogynia order, belonging to the icofandria class of plants; and in the natural method ranking under the 19th order, *Hesperideæ*. The calyx is quadripartite, superior; the petals four; the fruit a monospermous quadrangular plum. There are two species, both natives of the hot parts of Asia. They rise from 20 to 30 feet high; and bear plum-shaped fruit, inclosing one nut. They are too tender to live in Britain, unless they are constantly kept in a stove.

EVICITION, in law, signifies a recovery of lands or tenements by law.

EVIDENCE, that perception of truth which arises either from the testimony of the senses or from an induction of reason.

EVIDENCE, in law, signifies some *proof* by testimony of men upon oath, or by writings or records. It is called *evidence*, because thereby the point in issue in a cause to be tried is to be made *evident* to the jury; for *probationes debent esse evidentes et perspicue*. The system of evidence, as now established in our courts of common law, is very full, comprehensive, and refined; far different from, and superior to, any thing known in the middle ages; as far superior in that as in all other improvements and refinements in science, arts, and manners.

The nature of evidence during the ages of ignorance was extremely imperfect, and the people were incapable of making any rational improvement. Thus it was the imperfection of human reason that caused the invention and introduction of the ORDEAL, as an appeal to the Supreme Being. As men are unable to comprehend the manner in which the Deity carries on the government of the universe, by equal, fixed, and general laws, they are apt to imagine, that in every case which their passions or interest render important in their own eyes, the Supreme Ruler of all ought visibly to display his power in vindicating innocence, and punishing vice.

EVIL, in philosophy, &c. is either moral or natural. Moral evil is the disagreement between the actions of a moral agent, and the rule of those actions

what

Eugenia.
Evil.

Evil

Euler.

* See Moral Philosophy.

whatever it is*.—Natural evil is, whatever destroys or any way disturbs the perfection of natural beings: such as blindness, diseases, death, &c.

King's Evil, or *Scrophula*. See *MEDICINE-Index*.
Evil-Merodach, the son and successor of Nebuchadnezzar the Great, king of Babylon, succeeded to the crown in the year of the world 3443; but governed the kingdom during the indisposition of his father, who after seven years, having recovered his understanding, once more ascended the throne; and, as some believe, imprisoned his son Evil-Merodach. In this confinement it is supposed that Evil-Merodach made an acquaintance and friendship with Jehoiachim king of Judah who had been carried to Babylon by Nebuchadnezzar. However this was, it is certain, that soon after his succession to the throne, he delivered the king of Judah out of prison, after a confinement of 37 years, heaped many favours on him, and placed him above all the other kings who were at the court of Babylon, (2 Kings xxv. 27. Jer. lili. 31.) Evil-Merodach reigned but one year, according to the chronology of Archbishop Usher; but Dr Prideaux will have him to have reigned two years, and was succeeded by Neriglissar his sister's husband, who having been at the head of a conspiracy that put him to death, reigned in his stead. Others will have it, that this prince was immediately succeeded by his son BEL-SHAZZAR.

EULER (**LEONARD**), professor of mathematics, member of the imperial academy of Petersburg, ancient director of the royal academy of Berlin, and fellow of the royal society of London, as also correspondent member of the royal academy of sciences at Paris, was born at Basil, April 15th, 1707, of reputable parents. The years of his infancy were passed in a rural retreat at the village of Riehen, of which place his father was minister.—Being sent to the university of Basil, he attended regularly the different professors. As his memory was prodigious, he performed his academical tasks with uncommon rapidity; and all the time he gained by this was consecrated to geometry, which soon became his favourite study. The early progress he made in this science, only added a new ardour to his application; and thus he obtained a distinguished place in the attention and esteem of professor John Bernouilli, who was at that time one of the first mathematicians in Europe. In 1723, M. Euler took his degree as master of arts; and delivered on that occasion a Latin discourse, in which he drew a comparison between the philosophy of Newton and the Cartesian system, which was received with the greatest applause. He afterwards, at his father's desire, applied himself to the study of theology and the oriental languages. Though these studies were foreign to his predominant propensity, his success was considerable even in this line: however, with his father's consent, he returned to geometry as his principal object. He continued to avail himself of the counsels and instructions of M. Bernouilli; he contracted an intimate friendship with his two sons Nicholas and Daniel; and it was in consequence of these connections that he became afterwards the principal ornament of the academy of Petersburg. The project of erecting this academy, which had been formed by Peter the Great, was executed by Catharine I.; and the two young Bernouillis being in-

vited to Petersburg in 1725, promised Euler, who was desirous of following them, that they would use their utmost endeavours to procure for him an advantageous settlement in that city. In the mean time, by their advice, he applied himself with ardour to the study of physiology, to which he made a happy application of his mathematical knowledge; and he attended the medical lectures of the most eminent professors of Basil. This study, however, did not wholly engross his time: it did not even relax the activity of his vast and comprehensive mind in the cultivation of other branches of natural science. For while he was keenly engaged in physiological researches, he composed A Dissertation on the Nature and Propagation of Sound, and an answer to a prize question concerning the masting of ships; to which the academy of sciences adjudged the *accessit*, or second rank, in the year 1727. From this latter discourse, and other circumstances, it appears that Euler had early embarked in the curious and important study of navigation, which he afterwards enriched with so many valuable discoveries.

M. Euler's merit would have given him an easy admission to honourable preferment, either in the magistracy or university of his native city, if both civil and academical honours had not been there distributed by lot. The lot being against him in a certain promotion, he left his country, set out for Petersburg, and was made joint professor with his countrymen Messrs. Hermann and Daniel Bernouilli in the university of that city. At his first setting out in his new career, he enriched the academical collection with many memoirs, which excited a noble emulation between him and the Bernouillis; and this emulation always continued, without either degenerating into a selfish jealousy, or producing the least alteration in their friendship. It was at this time that he carried to new degrees of perfection the integral calculus, invented the calculation of sinuses, reduced analytical operations to a greater simplicity, and thus was enabled to throw new light on all the parts of mathematical science. In 1730, he was promoted to the professorship of natural philosophy; and in 1733 he succeeded his friend D. Bernouilli in the mathematical chair. In 1735, a problem was proposed by the academy which required expedition, and for the solution of which several eminent mathematicians had demanded the space of some months. The problem was solved by Euler in three days, to the great astonishment of the academy; but the violent and laborious efforts it cost him threw him into a fever, which endangered his life, and deprived him of the use of his right eye. The academy of sciences at Paris, which in 1738 had adjudged the prize to his memoir Concerning the Nature and Properties of Fire, proposed for the year 1740 the important subject of the sea-tides; a problem whose solution required the most arduous calculations, and comprehended the theory of the solar system. Euler's discourse on this question was adjudged a master-piece of analysis and geometry; and it was more honourable for him to share the academical prize with such illustrious competitors as Colin Maclaurin and Daniel Bernouilli, than to have carried it away from rivals of less magnitude. Rarely, if ever, did such a brilliant competition adorn the annals of the academy; and no subject perhaps, proposed by that learned body was ever treated with such

Euler.

Euler. accuracy of investigation and force of genius, as that which here displayed the philosophical powers of these three extraordinary men.

In the year 1741, M. Euler was invited to Berlin to augment the lustre of the academy, that was there rising into fame. He enriched the last volume of the miscellanies (*melanges*), of Berlin with five memoirs, which make an eminent, perhaps the principal figure in that collection. These were followed with an astonishing rapidity by a great number of important researches, which are scattered through the memoirs of the Prussian academy; of which a volume has been regularly published every year since its establishment in 1744. The labours of Euler will appear more especially astonishing, when it is considered, that while he was enriching the Academy of Berlin with a prodigious number of memoirs, on the deepest parts of mathematical science, containing always some new points of view, often sublime truths, and sometimes discoveries of great importance; he did not discontinue his philosophical contributions to the Academy of Petersburg, which granted him a pension in 1742, and whose memoirs display the marvellous fecundity of Euler's genius. It was with much difficulty that this great man obtained, in 1766, permission from the king of Prussia to return to Petersburg, where he desired to pass the rest of his days. Soon after his return, which was graciously rewarded by the munificence of Catharine II. he was seized with a violent disorder, which terminated in the total loss of his sight. A cataract, formed in his left eye, which had been essentially damaged by a too ardent application to study, deprived him entirely of the use of that organ. It was in this distressing situation that he dictated to his servant, a tailor's apprentice, who was absolutely devoid of mathematical knowledge, his knowledge of algebra; which by their intrinsic merit, in point of perspicuity and method, and the unhappy circumstances in which they were composed, have equally excited applause and astonishment. This work, though purely elementary, discovers the palpable characteristics of an inventive genius; and it is here alone that we meet with a complete theory of the analysis of Diophantus.

About this time M. Euler was honoured by the Academy of Sciences at Paris with the place of one of the foreign members of that learned body; and, after this, the academical prize was adjudged to three of his memoirs, *Concerning the Inequalities in the Motions of the Planets*. The two prize questions proposed by the same academy for 1779 and 1772 were designed to obtain from the labours of astronomers a more perfect *Theory of the Moon*. M. Euler, assisted by his eldest son, was a competitor for these prizes, and obtained them both. In this last memoir, he reserved for farther consideration several inequalities of the moon's motion, which he could not determine in his first theory, on account of the complicated calculations in which the method he then employed had engaged him. He had the courage afterward to review his whole theory, with the assistance of his son and Messrs Krafft and Lexell, and to pursue his researches until he had constructed the new tables, which appeared, together with the great work, in 1772. Instead of confining himself, as before, to the fruitless integration of three differential equations of the second degree, which are

furnished by mathematical principles, he reduced them to three ordinates, which determine the place of the moon; he divided into classes all the inequalities of that planet, as far as they depend either on the elongation of the sun and moon, or upon the eccentricity, or the parallax, or the inclination of the lunar orbit. All these means of investigation, employed with such art and dexterity as could only be expected from an analytical genius of the first order, were attended with the greatest success; and it is impossible to observe, without admiration, such immense calculations on the one hand, and on the other the ingenious methods employed by this great man to abridge them, and to facilitate their application to the real motion of the moon. But this admiration will become astonishment, when we consider at what period and in what circumstances all this was effectuated by M. Euler. It was when he was totally blind, and consequently obliged to arrange all his computations by the sole powers of his memory and his genius. It was when he was embarrassed in his domestic circumstances by a dreadful fire, that had consumed great part of his substance, and forced him to quit a ruined house, of which every corner was known to him by habit, which, in some measure, supplied the place of sight. It was in these circumstances that Euler composed a work which, alone, was sufficient to render his name immortal. The heroic patience and tranquillity of mind which he displayed here, needs no description; and he derived them not only from the love of science, but from the power of religion. His philosophy was too genuine and sublime to stop its analysis at mechanical causes; it led him to that divine philosophy of religion which ennobles human nature, and can alone form a habit of true magnanimity and patience in suffering.

Some time after this, the famous Wentzell, by couching the cataract, restored Mr Euler's sight; but the satisfaction and joy that this successful operation produced, were of short duration. Some instances of negligence on the part of his surgeons, and his own impatience to use an organ, whose cure was not completely finished, deprived him of his sight a second time; and this relapse was accompanied with tormenting pain. He, however, with the assistance of his sons, and of Messrs Krafft and Lexell, continued his labours; neither the loss of his sight nor the infirmities of an advanced age could damp the ardour of his genius. He had engaged to furnish the academy of Petersburg with as many memoirs as would be sufficient to complete its acts for 20 years after his death. In the space of seven years he transmitted to the academy, by Mr Goltwin, above 70 memoirs, and above 200 more, which were revised and completed by the author of this paper. Such of these memoirs as were of ancient date were separated from the rest, and form a collection that was published in the year 1783, under the title of *Analytical Works*.

Euler's knowledge was more universal than could be well expected in one, who had pursued with such unremitting ardour mathematics and astronomy as his favourite studies. He had made a very considerable progress in medical, botanical, and chemical science. What was still more extraordinary, he was an excellent scholar, and possessed what is generally called *erudition*.

Euler.

Euler
Eumarides

dition in a very high degree. He had read, with attention and taste, the most eminent writers of ancient Rome; the civil and literary history of all ages and all nations was familiar to him; and foreigners who were only acquainted with his works, were astonished to find in the conversation of a man whose long life seemed solely occupied in mathematical and physical researches and discoveries, such an extensive acquaintance with the most interesting branches of literature. In this respect, no doubt, he was much indebted to a very uncommon memory, which seemed to retain every idea that was conveyed to it, either from reading or from meditation. He could repeat the *Æneid* of Virgil, from the beginning to the end, without hesitation, and indicate the first and last line of every page of the edition he used.

Several attacks of a vertigo, in the beginning of September 1783, which did not prevent his calculating the motions of the aerostatical globes, were, nevertheless the forerunners of his mild and happy passage from this scene to a better. While he was amusing himself at tea with one of his grandchildren, he was struck with an apoplexy, which terminated his illustrious career at the age of 76. His constitution was uncommonly strong and vigorous; his health was good; and the evening of his long life was calm and serene, sweetened by the fame that follows genius, the public esteem and respect that are never withheld from exemplary virtue, and several domestic comforts which he was capable of feeling, and therefore deserved to enjoy.

EULOGY, EULOGIA, in church history. When the Greeks have cut a loaf or piece of bread to consecrate it, they break the rest into little bits, and distribute it among the persons who have not yet communicated, or send it to persons that are absent; and these pieces of bread are what they call *eulogies*. The word is Greek, *εὐλογία*, formed of *eu bene*, "well," and *λογω dico*, "I say, speak;" q. d. *benedictum*, "blessed."

The Latin church has had something like eulogies for a great many ages; and thence arose the use of their holy bread.

The name *eulogy* was likewise given to loaves or cakes brought to church by the faithful to have them blessed.

Lastly, the use of the term passed hence to mere presents made to a person without any benediction. See the Jesuit Gretser, in his *Treatise de Benedictionibus & Maledictionibus*, lib. ii. cap. 22, 24, &c. where he treats of eulogies thoroughly.

From a passage in Bolandus, on the life of St Melaine, cap. 4. it appears, that eulogies were not only of bread, but any kind of meat blessed and hallowed for that purpose. Add, that almost every body blessed and distributed eulogies; not only bishops and priests, but even hermits, though laymen, made a practice of it. Women also would sometimes send eulogies.

The wine sent as a present was also held an eulogy. Bolandus remarks farther, that the eucharist itself was also called *eulogy*.

EULOGY, likewise means an encomium on any person, on account of some virtue or good quality.

EUMARIDES, of *ευμαρίς* "easy," among the ancients, a kind of shoes common to men and women.—The eumarides were used for pomp and delicacy, being neat, and painted with various colours.

VOL. VII.

Eumenes

EUMENES, a Greek officer in the army of Alexander, son of a charioteer. He was the most worthy of all the officers of Alexander to succeed after the death of his master. He conquered Paphlagonia, and Cappadocia, of which he obtained the government, till the power and jealousy of Antigonus obliged him to retire. He joined his forces to those of Perdiccas, and defeated Craterus and Neoptolemus. Neoptolemus perished by the hand of Eumenes. When Craterus had been killed during the war, his remains received an honourable funeral from the hand of the conqueror; and Eumenes, after weeping over the ashes of a man who once was his dearest friend, sent his remains to his relations in Macedonia. Eumenes fought against Antipater and conquered him; and after the death of Perdiccas his ally, his arms were directed against Antigonus, by whom he was conquered A. U. C. 433, chiefly by the treacherous conduct of his officers. This fatal battle obliged him to disband the greatest part of his army to secure himself a retreat: and he fled only with 700 faithful attendants to a fortified place on the confines of Cappadocia, called *Nora*, where he was soon besieged by the conqueror. He supported the siege for a year with courage and resolution, but some disadvantageous skirmishes so reduced him, that his soldiers, grown desperate, and bribed by the offers of the enemy, had the infidelity to betray him into the hands of Antigonus. The conqueror, from shame or remorse, had not the courage to visit Eumenes; but when he was asked by his officers, in what manner he wished him to be kept, he answered, keep him as carefully as you would keep a lion. This severe command was obeyed; but the asperity of Antigonus vanished in a few days, and Eumenes, delivered from the weight of chains, was permitted to enjoy the company of his friends. Even Antigonus hesitated whether he should not restore to his liberty a man with whom he had lived in the greatest intimacy while both subservient to the command of Alexander; and these secret emotions of pity and humanity were not a little increased by the petitions of his son Demetrius for the release of Eumenes. But the calls of ambition prevailed; and when Antigonus recollected what an active enemy he had in his power, he ordered Eumenes to be put to death in the prison. His bloody commands were executed 315 years before the Christian era. Such was the end of a man who raised himself to power by merit alone. His skill in public exercises first recommended him to the notice of Philip; and under Alexander, his attachment and fidelity to the royal person, and particularly his military accomplishments, promoted him to the rank of a general. Even his enemies revered him; and Antigonus, by whose orders he perished, honoured his remains with a splendid funeral, and conveyed his ashes to his wife and family in Cappadocia. It has been observed, that Eumenes had such an universal influence over the successors of Alexander, that none during his lifetime dared to assume the title of king.

EUMENES I. king of Pergamus, who succeeded his uncle Philetærus about 264 years before Christ. He made war against Antiochus the son of Seleucus, and enlarged his possessions by seizing upon many of the cities of the kings of Syria. He lived in alliance with the Romans, and made war against Prusias king of

E Bithynia.

Eumenes Bithynia. He was a great patron of learning; but being much given to wine, he died of an excess in drinking, after a reign of 22 years. He was succeeded by Attalus.

EUMENES II. succeeded his father Attalus on the throne of Asia and Pergamus. His kingdom was small and poor, but he rendered it powerful and opulent; and his alliance with the Romans did not a little contribute to the increase of his dominions after the victories obtained over Antiochus the Great. He carried his arms against Prusias and Antigonus; and died 160 years before Christ, after a reign of 40 years, leaving the kingdom to his son Attalus II. He has been admired for his benevolence and magnanimity; and his love of learning greatly enriched the famous library of Pergamus, which had been founded by his predecessors in imitation of the Alexandrian collection of the Ptolemies. His brothers were so attached to him and devoted to his interest, that they enlisted among his body-guards to show their fraternal fidelity.

EUMENES, a celebrated orator of Athens about the beginning of the fourth century. Some of his harangues and orations are extant. An historical writer in Alexander's army.

EUMENIDES, a name given to the furies by the ancients. They sprang from the blood of the wound which Cælus received from his son Saturn. According to others they were daughters of Earth, and conceived from the blood of Saturn. Some make them daughters of Acheron and Night, or Pluto and Proserpine. According to the more received opinions, they were three in number, Tisiphone, Megara, and Aleto, to which some add Nemesis. Plutarch mentions only one called *Adrasta*, daughter of Jupiter and Necessity. They were supposed to be the ministers of the vengeance of the gods. They were stern and inexorable; and were always employed in punishing the guilty upon earth as well as in the infernal regions. They inflicted their vengeance upon earth by wars, pestilence and dissensions, and by the secret stings of conscience; and in hell they punished the guilty by continual flagellation and torments. They were also called *Furie Erinnys*. Their worship was almost universal; and people dared not to mention their names or fix their eyes upon their temples. They were honoured with sacrifices and libations; and in Achaia they had a temple, which when entered by any one guilty of a crime, suddenly rendered him furious, and deprived him of the use of his reason. In the sacrifices, the votaries used branches of cedar and of alder, hawthorn, saffron, and juniper; and the victims were generally turtle-doves and sheep, with libations of wine and honey. They were usually represented with a grim and frightful aspect, with a black and bloody garment, and with serpents wreathing round their head instead of hair. They held a burning torch in one hand and a whip of scorpions in the other; and were always attended by Terror, Rage, Palenesis, and Death. In hell they were seated around Pluto's throne, as the ministers of his vengeance.

EUMENIDIA, festivals in honour of the Eumenides, called by the Athenians *εὐμενίδαι* "venerable goddesses." They were celebrated once every year, with sacrifices of pregnant ewes, with offerings of cakes made by the most eminent youths, and libations of honey

and wine. At Athens none but free-born citizens were admitted, such as had led a life the most virtuous and unfulfilled.

EUMOLPIDES, the priests of Ceres at the celebration of her festivals at Eleusis. They were descended from Eumolpus, a king of Thrace, who was made priest of Ceres by Erechtheus king of Athens. He became so powerful after his appointment to the priesthood, that he maintained a war against Erechtheus. This war proved fatal to both. Erechtheus and Eumolpus were both killed, and peace was re-established among their descendants, on condition that the priesthood ever remained in the family of Eumolpus, and the regal power in the house of Erechtheus. The priesthood remained in the family of Eumolpus for 1200 years; and this is still more remarkable, because he who was once appointed to the holy office was obliged to remain in perpetual celibacy.

EUMOLPUS, a king of Thrace, son of Neptune and Chione. He was thrown into the sea by his mother, who wished to conceal her shame from her father. Neptune saved his life and carried him into Æthiopia, where he was brought up by a woman, one of whose daughters he married. An act of violence to his sister-in-law obliged him to leave Æthiopia, and he fled to Thrace with his son Ismarus, where he married the daughter of Tegyrus, the king of the country. This connection to the royal family rendered him ambitious; he conspired against his father-in-law, and fled, when the conspiracy was discovered, to Attica, where he was initiated in the mysteries of Ceres of Eleusis, and made hierophantes or high priest. He was afterwards reconciled to Tegyrus, and inherited his kingdom. He made war against Erechtheus, king of Athens, who had appointed him to the office of high priest, and perished in battle about 1380 years before the Christian era. His descendants were also invested with the priesthood, which remained for about 1200 years in that family.

EUNAPIUS, a native of Sardis in Lydia, a celebrated sophist, physician, and historian, who flourished in the 4th century, under the emperors Valentinian, Valens, and Gratian. He wrote "The lives of the Philosophers and Sophists," in which he frequently shows himself a bitter enemy to the Christians: also a "History of the Cæsars, which he deduced from the reign of Claudius where Herodian left off, down to that of Arcadius and Honorius. The history is lost; but we have the substance of it in Zosimus, who is supposed to have done little more than copy it.

EUNOMIANS, in church history, Christian heretics in the 4th century. They were a branch of Arians, and took their name from EUNOMIUS bishop of Cyzicus; whose confession of faith here follows, extracted from Cave's *Historia Literaria*, vol. i. p. 223. "There is one God uncreated and without beginning; who has nothing existing before him, for nothing can exist before what is uncreated; nor with him, for what is uncreate must be one; nor in him, for God is a simple and uncompounded being. This one simple and eternal being is God, the creator and ordainer of all things: first indeed and principally of his only begotten Son; and then, through him, of all other things. For God begot, created, and made, the Son, only by his direct operation and power, before all things, and every

Eumolpi-
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Eunomius,
Eunuch.

every other creature; not producing, however, any being like himself, or imparting any of his own proper substance to the Son: for God is immortal, uniform, indivisible; and therefore cannot communicate any part of his own proper substance to another. He alone is unbegotten; and it is impossible that any other being should be formed of an unbegotten substance. He did not use his own substance in begetting the son, but his will only: nor did he beget him in the likeness of his substance, but according to his own good pleasure. He then created the Holy Spirit, the first and greatest of all spirits, by his own power indeed and operation mediately, yet by the immediate power and operation of the son. After the Holy Spirit he created all other things in heaven and in earth, visible and invisible, corporeal and incorporeal, mediately by himself, by the power and operation of the Son," &c.

EUNOMIUS, a famous heresiarch of the 4th century, the disciple of Eulius, but abundantly more subtle than his master, as well as more bold in propagating the opinions of his sect, who after him are called **EUNOMIANS**. He was ordained bishop of Cyzicus; but gave so much disturbance by the intemperance of his zeal, that he was deposed more than once. At last, tired with being tossed about, he petitioned to retreat to the place of his birth, Dacora in Cappadocia; where he died very old about the year 374, after experiencing a variety of sufferings. The greatest part of his works are lost. There is, however, besides two or three small pieces, a confession of his faith remaining which Cave inserted in his *Historia Literaria*, from a manuscript in archbishop Tennyson's library. See the preceding article.

EUNUCH, a castrated person. See the article **CASTRATION**.—The word is formed from *εὐνὴ* *εἶναι*, q. d. *lecti curam habet*, "guardian or keeper of the bed."

In Britain, France, &c. eunuchs are never made but upon occasion of some disease, which renders such an operation necessary: but in Italy they make great numbers of children, from one to three years of age, eunuchs every year, to supply the operas and theatres of all Europe with singers. M. de la Lande, in his *Voyage d'Italie*, asserts, that there are public shops at Naples where this cruel operation is performed, and that over the door of these shops is inscribed *Qui si castrano ragazzi*. But Dr Burney informs us, that he was not only utterly unable to see or hear of any such shops during his residence in that city, but was constantly told, both by the natives and English settled there, that the laws against such a practice were so numerous and severe, that it was never performed but with the utmost secrecy.

In the eastern parts of the world, they make eunuchs in order to be guards or attendants on their women. The seraglio of the eastern emperors are chiefly served and guarded by eunuchs; and yet, from good authority, we learn, that the rich eunuchs in Persia and other countries keep seraglios for their own use. Those who, out of an imprudent zeal to guard themselves from sensual pleasures, made themselves eunuchs, were, by the council of Nice, condemned and excluded from holy orders. There are several severe prohibitions in Germany against the making of eunuchs; and in France an eunuch must not marry, not even with the consent of the woman.

Eunuch.

Though the practice of castration is detestable in every point of view; yet there appears no real foundation for the injurious opinion generally entertained of eunuchs, viz. that they are all cowards, and devoid of genius for literature or any solid study. "As to genius (says the author last quoted), I never found those of the first class in music deficient in intellectual abilities for more serious studies. Indeed I have seen real genius and disposition for literary pursuits, in more than one great opera singer; and as for composition, and the theory of music, not only the best singers of the Pope's chapel ever since the beginning of the last century, but the best composers, are among the sopranis, in that service." With respect to the operation affecting the mind so much as to deprive it of all fortitude in times of danger, there is great reason to doubt the fact: most of the generals of eastern monarchs having been at all times of this class; and the bravest stand that ever was made against Alexander the Great was at Gaza, under the command of one of Darius's generals, who was a eunuch. Ammianus Marcellinus gives an account of Menophilus, a eunuch, to whom Mithridates intrusted his daughter; which proves the possibility of such unfortunate persons possessing a heroism equal to that of the most determined Stoic.

It is very certain, that the ancients never supposed eunuchs to have been men of inferior intellects, or that they possessed less vigour of mind than other men. At least the Persians were not of this opinion; for Herodotus* relates, that when they had taken possession of some Ionian cities, *παῖδας τε τὰς ἐν εὐδαιμονίᾳ καὶ ἐξέταμον, καὶ ποιεῖν αὐτοὺς ἐν αὐτοῖς πόλεσιν ἐνέχουσιν*. It is certain, however, Herodotus †, in relating the melancholy story of Hermotimus, says, that *παρὰ τοῖσι βαρβάροισι τιμιώτεροι εἰσὶν οἱ εὐνοχοὶ, πιστοὶ ἐνικὰ πάσης, τὰν πόλιν*. "among the barbarians, the eunuchs are more valued than other men on account of their universal fidelity." It appears from this passage of Herodotus, that in Persia eunuchs were far from being objects of contempt; and were even frequently promoted to the highest honours. This was indeed the case with Hermotimus. We find in Agathias, who was one of the Byzantine historians, that a general in the Roman army, named *Narxes*, was a eunuch. This was in the latter ages. In Plutarch's Life of Aristides, Themistocles is related to have chosen an eunuch, whose name was *Arnaces*, from among his prisoners, to send on a secret embassy to Xerxes. This surely may serve to show, that mental imbecility was not supposed by the Greeks to be the characteristic of eunuchism. The same story of the confidence placed in Arnaces, who was one of the Persian king's eunuchs, is related also in the life of Themistocles. Aristotle paid such high respect to Hermias, who was a eunuch and governor of Atarneus, which is in Mysia, that he even offered sacrifices in honour of him: as Lucian informs us in his Dialogue entitled *Eunuchus*. This regard of Aristotle for Hermias has been often celebrated, and is mentioned by Suidas, Harpocration, and others.

EUNUCHS, in church-history, a sect of heretics in the third century, who were mad enough to castrate, not only those of their own persuasion, but even all others they could lay hold of. They took their rise from the example of Origen, who, misunderstanding the following words of our Saviour, "and eunuchs who made themselves

* Lib. vi.
32 p. 451.
ed. Wesseling.
† Lib. vi.
p. 668.

Evocati themselves eunuchs for the kingdom of heaven," castrated himself.

Evolutus. **EVOCATI**, soldiers among the Romans, who having served their full time in the army, went afterwards volunteers at the request of some favourite general; on which account they were called by the honourable names of *Emeriti* and *Beneficarii*.

EVOCATION (*Evocatio*), among the Romans, a religious ceremony always observed by them at the undertaking a siege, wherein they solemnly called upon the gods and goddesses of the place to forsake it and come over to them. Without the performance of this ceremony, they either thought that the place could not be taken, or that it would be a sacrifice to take the gods prisoners. They always took it for granted that their prayer was heard, and that the gods had deserted the place and come over to them, provided they were able to make themselves masters of it.

EUODIA, in botany: A genus of the monogynia order, belonging to the tetrandria class of plants. The calyx is a tetraphyllous perianthium; the corolla consists of four spatulated, sharp, and open petals; the stamina are four subulated filaments as long as the petals; the pericarpium four, roundish, bivalve, and monospermous capsules; the seeds solitary.

EVOLUTION, in algebra, the unfolding or opening of a curve, and making it describe an evolvent. The word *evolutio* is formed of the preposition *e* "out;" and *volvo* "I roll, or wind;" q. d. an *unwinding*, or *unrolling*.

The equable evolution of the periphery of a circle, or other curve, is such a gradual approach of the circumference to rectitude, as that its parts do all concur and equally evolve or unbend; so that the same line becomes successively a less arc of a reciprocally greater circle; till at last they change into a straight line. In the Philosophical Transactions, N^o 260. a new quadratrix to the circle is found by this means, being the curve described by the equable evolution of its periphery.

EVOLUTION, is also used for the extraction of roots out of powers; in which sense it stands opposed to involution. See ALGEBRA, p. 413.

EVOLUTION, in the art of war, the motion made by a body of troops, when they are obliged to change their form and disposition, in order to preserve a post or occupy another, to attack an enemy with more advantage, or to be in a condition of defending themselves the better.

It consists in doublings, counter-marches, conversions, &c. A battalion, doubles the ranks, when attacked in front or rear, to prevent its being flanked or surrounded; for then a battalion fights with a larger front. The files are doubled, either to accommodate themselves to the necessity of a narrow ground, or to resist an enemy that attacks them in flank. But if the ground will allow it, conversion is much preferable; because, after conversion, the battalion is in its first form, and opposes the file-leaders, which are generally the best men, to the enemy; and likewise, because doubling the files in a new or not well-disciplined regiment, they may happen to fall into disorder. See DOUBLING.

EVOLVULUS, in botany: A genus of the tetragynia order, belonging to the pentandria class of plants; and in the natural method ranking under the 29th or-

der *Campanaceæ*. The calyx is pentaphyllous; the corolla quinquefid and verticillated; the capsule triocular; the seeds solitary.

EUONYMUS, the SPINDLE-TREE: A genus of the monogynia order, belonging to the pentandria class of plants; and in the natural method ranking under the 43d order, *Dumosæ*. The corolla is pentapetalous; the capsule pentagonal, quinquelocular, quinquevalved, and coloured; the seeds hooded. There are two species, 1. The europæus, hath an upright woody stem 10 or 15 feet high, garnished with oblong opposite leaves: from the sides of the branches proceed small bunches of greenish quadrifid flowers, succeeded by pentagonous capsules, disclosing their seeds in a beautiful manner in autumn. 2. The americanus, or evergreen spindle-tree, hath a shrubby stem, dividing into many opposite branches, rising six or eight feet high, garnished with spear-shaped evergreen leaves growing opposite, and from the sides and ends of the branches. The flowers are quinquefid and whitish, and come out in small bunches, succeeded by roundish, rough, and protuberant capsules, which rarely perfect their seeds in Britain. Both these species are hardy, and will succeed in any soil or situation. The berries of the first sort vomit and purge very violently, and are fatal to sheep. If powdered and sprinkled upon hair, they destroy lice. If the wood is cut when the plant is in blossom, it is tough and not easily broken; and in that state it is used by watchmakers for cleaning watches, and for making skewers and tooth-pickers. Cows, goats, and sheep, eat this plant; horses refuse it.

EUPATORIUM, HEMP-AGRIMONY: A genus of the polygamia æqualis order, belonging to the syngenesia class of plants; and in the natural method ranking under the 49th order, *Compositæ*. The receptacle is naked; the pappus feathery; the calyx imbricated and oblong; the style semibifid and long. There are 13 species, many of them herbaceous flowery perennials, producing annual stalks from two to three or five feet high, terminated by clusters of compound flowers of a red, purple, or white, colour. They are easily propagated by seeds, or parting the roots in autumn or spring. One species, viz. the cannabinum, or water hemp-agrimony, is a native of Britain. It is found wild by the sides of rivers and ditches, and has pale red blossoms. It has an acrid smell, and a very bitter taste, with a considerable share of pungency. The leaves are much recommended for strengthening the tone of the viscera, and as an aperient; and said to have excellent effects in the dropsy, jaundice, cachexies, and scorbutic disorders. Boerhaave informs us, that this is the common medicine of the turf-diggers in Holland, against scurvy, foul ulcers, and swellings in the feet, to which they are subject. The root of this plant is said to operate as a strong cathartic: but it is hardly used in Britain, and has no place in our pharmacopœias.

EUPATRIDÆ, in antiquity, a name given by Theseus to the nobility of Athens, as distinguished from the Geomori and Demiorgi. The Eupatridæ, by Theseus's establishment, had the right of choosing magistrates, teaching and dispensing the laws, and interpreting holy and religious mysteries. The whole city, in all other matters, was reduced to an equality. The Geomori were husbandmen, and inferior to the Eupatridæ,

onymus
Eupatridæ.

Euphorbia.

Plate CLXXXVII.

Fig. 1.



Fig. 2.



Fig. 3. E. cocotus, the Flying Fish.



Fenchard sculp.



Euphony tridæ in point of fortune; the Demiurgi were artificers, and fell short of the Eupatridæ in number.

Euphorbia. **EUPHONY**, in grammar, an easiness, smoothness, and elegance of pronunciation. The word is formed of *eu, bene*, "well," and *φων, vox* "voice." Quintilian calls *euphonia*, "*vocalitas*;" Scagliar, "*facilis pronuntiatio*."

Euphonia is properly a kind of figure whereby we suppress a too harsh letter, or convert it into a smoother, contrary to the ordinary rules. There are examples enough in all languages.

EUPHYMISM. See ORATORY.

EUPHORBIA, SPURGE: A genus of the trigynia order, belonging to the dodecandria class of plants; and in the natural method ranking under the 38th order, *Tricoccæ*. The corolla is tetrapetalous or pentapetalous, placed on the calyx; the calyx is monophyllous and ventricose; the capsule tricoccous. There are 62 species, six of which are natives of Great Britain. They are mostly shrubby and herbaceous succulents, frequently armed with thorns, having stalks from 10 or 12 inches to as many feet in height, with quadripetalous flowers of a whitish or yellow colour. They are easily propagated by cuttings; but the foreign kinds must be always kept in pots in a stove. If kept dry, they may be preserved for several months out of the ground, and then planted, when they will as readily take root as though they had been fresh. The juice of all the species is so acrid, that it corrodes and ulcerates the body wherever it is applied; so that physicians have seldom ventured to prescribe it internally. Warts, or corns, anointed with the juice, presently disappear. A drop of it put into the hollow of an aching tooth, gives relief, like other corrosives, by destroying the nerve. Some people rub it behind the ears, that it may blister.

See Plate
CLXXXVII.
fig. 1.—Fig.
2. repre-
sent part of
the stem
and flowers
magnified.

Patterson's
Journey to
the Cape,
p. 62.

One of the foreign species, named *esula*, is such a violent corrosive, that, if applied to any part of the body, it produces a violent inflammation, which is soon succeeded by a swelling that degenerates into a gangrene and proves mortal. There is a species at the Cape, which supplies the Hottentots with an ingredient for poisoning their arrows. Their method of making this pernicious mixture, is by first taking the juice extracted from the Euphorbia, and a kind of caterpillar peculiar to another plant which has much the appearance of a species of *rhus*. They mix the animal and vegetable matter; and after drying it, they point their arrows with this composition, which is supposed to be the most effectual poison of the whole country. The euphorbia itself is also used for this purpose, by throwing the branches into fountains of water frequented by wild beasts, which after drinking the water thus poisoned, seldom get 1000 yards from the brink of the fountain before they fall down and expire. This plant grows from about 15 to 20 feet in height, sending out many branches full of strong spines. The natives cut off as many of the branches as they think necessary for the destruction of the animals they intend to poison. They generally conduct the water a few yards from the spring into a pit made for the purpose; after which they put in the euphorbia, and cover the spring, so that the creatures have no choice. No animal escapes which drinks of such water, though the flesh is not injured by the poison.

EUPHORBIA, in the materia medica, a gummi-resinous substance, which exudes from a large oriental tree, (*EUPHORBIA officinarum*). It is brought to us immediately from Barbary, in drops of an irregular form; some of which, upon being broken, are found to contain little thorns, small twigs, flowers, and other vegetable matters; others are hollow, without any thing in their cavity: the tears in general are of a pale yellow colour externally, somewhat white within: they easily break between the fingers. Lightly applied to the tongue, they effect it with a very sharp biting taste; and upon being held for some time in the mouth, prove vehemently acrimonious, inflaming and exulcerating the fauces, &c. Euphorbium is extremely troublesome to pulverise; the finer part of the powder, which flies off, affecting the head in a violent manner. The acrimony of this substance is so great as to render it absolutely unfit for any internal use: several correctors have been contrived to abate its virulence; but the best of them are not to be trusted to: and as there seems to be no real occasion for it, unless for some external purposes, we think, with Hoffman and others, that it ought to be expunged from the catalogue of internal medicines. And accordingly it has now no place in the London or Edinburgh pharmacopœias. But it is still retained in most of the foreign ones, and is sometimes used as a sternutatory.

EUPHORBUS, a famous Trojan, son of Panthöus. He was the first who wounded Patroclus, whom Hector killed. He perished by the hand of Menelaus, who hung his shield in the temple of Juno at Argos. Pythagoras, the founder of the doctrine of the metempsychosis or transmigration of souls, affirmed that he had been once Euphorbus, and that his soul recollected many exploits which had been done while it animated that Trojan's body. As a further proof of his assertion, he showed at first sight the shield of Euphorbus in the temple of Juno.

EUPHORION of CHALCIS, a poet and historian, born in the 126th Olympiad. Suetonius says that Tiberius composed verses in imitation of Euphorion, Rianius, and Parthenius; with whom he was charmed to such a degree, that he ordered their writings and their pictures to be kept in all the public libraries, among the ancient and celebrated authors.

EUPHRASIA, EYE-BRIGHT: A genus of the angiospermia order, belonging to the didynamia class of plants; and in the natural method ranking under the 40th order, *Personatæ*. The calyx is quadrid and cylindrical; the capsule bilocular, ovato-oblong; the shorter two antheræ, with the base of the one lobed terminated by a small spine. There are seven species; two of which, viz. the officinalis and odontites, are natives of Britain. The first of these, which hath blue flowers, is a weak astringent, and was formerly much celebrated in disorders of the eyes; but the present practice hath not only disregarded its internal, but also its external, use. This plant will not grow but when surrounded by others taller than itself. Cows, horses, goats, and sheep, eat it; swine refuse it.

EUPHRATES, a river universally allowed to take its rise in Armenia Major; but in what particular spot, or in what direction it afterwards shapes its course, there is the greatest disagreement. Strabo says, that the

Euphor-
bium
||
Euphrates.

Euphrates the Euphrates rises in mount Abus, which he joins with, or accounts a part of, mount Taurus; that its beginning is on the north side of mount Taurus; and that running, first westward through Armenia, then striking off to the south, it forces its way through that mountain: and thus it rises in the south of Armenia, mount Taurus being the boundary on that side; and runs through its south part, quite to Cappadocia, conterminal with Armenia Minor; or quite to this last, or to its south limit; to reach which, it must bend its west course a little north; because the Taurus, from which it rose, lies lower, or more to the south, and almost parallel with Melitene: and that then it turns to the south, in order to break through the Taurus, and escape to Syria, and then take a new bend to Babylonia. To this account of Strabo, Pliny runs quite counter; adducing eye-witnesses, who carry the Euphrates from north to south in a right line, till it meets mount Taurus; placing the springs together with mount Abus, or Aba, which inclines to the west, to the north of Taurus. Ptolemy strikes a middle course between both, placing springs to the east, as Strabo does; whence, he says, it runs in a long course westward, before it bends south; and that it rises not from mount Taurus, but far to the north of it; and he makes it run straight west from its rise, then turn south spontaneously, without any interposing obstacle, in a manner quite different from Strabo, Mela, and others, who make the Taurus the cause of this turn. The Euphrates naturally divides into two channels, one through Babylon, and the other through Seleucia, besides the several artificial cuts made between it and the Tigris about Babylon: and these cuts or trenches are what the Psalmist calls the rivers of Babylon, on the willows of which the captives hung their harps. It is probable, that the Euphrates naturally poured into the sea at one particular mouth, before these cuts were made. A thing appearing so evident to the ancients, that Pliny has set down the distance between the mouths of the Euphrates and the Tigris; and he says, some made it 25, and others 7, miles; but that the Euphrates being for a long time back intercepted in its course by cuts, made for watering the fields, only the branch called the *Pastigris* fell into the sea, the rest of it into the Tigris, and both together into the Persian Gulf. Overflowing the country through which it runs, at stated times of the year, like the Nile, it renders it fertile.

EUPOLIS, an Athenian comic poet, flourished about the 85th Olympiad. He took the freedom of the ancient comedy in lashing the vices of the people. He lost his life in a sea-fight between the Athenians and Lacedemonians; and his fate was so much lamented, that after his death it was enacted that no poet should serve in the wars. Some say Alcibiades put him to death for his satirical freedom.

EVREMOND (Charles de St. Denis), born at St. Denis le Guast in Lower Normandy in 1613, was designed for the gown, and entered on the study of the law; but he soon quitted that, and was made an ensign before he was 16. A military life did not hinder him from cultivating polite literature; and he signalized himself by his politeness and wit as much as by his bravery. The king made him a mareschal de camp, and gave him a pension of 3000 livres per annum. He ser-

ved under the duke of Candale in the war of Guienne; Evremond and in Flanders, till the suspension of arms was agreed on between France and Spain: he afterwards accompanied cardinal Mazarine when he went to conclude the peace with Don Lewis de Haro, the king of Spain's first minister. He wrote, as he had promised, a long letter to the marquis de Crequi, of this negociation; in which he showed, that the cardinal had sacrificed the honour of France to his own private interest, and rallied him in a very satirical manner. This letter falling into the hands of the cardinal's creatures some time after his death, was represented as a state-crime, and he was obliged to fly to Holland. He had too many friends in England (whither he had taken a tour the year before with the count de Soissons, sent to compliment Charles II. upon his restoration) to make any long stay in Holland; and therefore passed over into England, where he was received with great respect, and admitted into intimated friendship with several persons of distinction. The king gave him a pension of 300l. a year. He had a great desire to return to his native country; and, after the peace of Nimeguen, wrote a letter in verse to the king of France to ask leave, but in vain. Upon the death of king Charles, he lost his pension. He did not rely much on king James; though that prince had shown himself extremely kind to him. The revolution was advantageous to him. King William, who had known him in Holland, gave him substantial marks of his favor. He died of a strangury in 1703, aged 90; and was interred in Westminster-abbey, where a monument is erected to his memory. His behaviour was engaging, his humour cheerful, and he had a strong disposition to satire; he professed the Romish religion, in which he was born; but at the bottom was certainly a freethinker. He always spoke of his disgrace with the resolution of a gentleman; and whatever strong desire he had to return to his country, he never solicited the favour with meanness: therefore, when this leave was signified to him unexpectedly in the decline of his life, he replied, that the infirmities of age did not permit him to leave a country where he lived agreeably. There have been many editions of his works: but the best is that of Amsterdam in 1726, in 5 vols 12mo, to which is prefixed his life by Doctor Des Maizeaux; who has also given an accurate English translation of them in 3 vols 8vo.

EURIPIDES, one of the Greek poets who excelled in tragedy, was born about 468 B. C. in the isle of Salamis, whither his father and mother had retired a little before Xerxes entered Attica. He learnt rhetoric under Prodicus, morality under Socrates, and natural philosophy under Anaxagoras; but at 18 years of age abandoned philosophy, in order to apply himself to dramatic poetry. He used to shut himself up in a cave to compose his tragedies, which were extremely applauded by the Greeks. The Athenian army, commanded by Nicias, being defeated in Sicily, the soldiers purchased their lives and liberties by reciting the verses of Euripides; such esteem and veneration had the Sicilians for the pieces wrote by this excellent poet. Socrates, the wisest of the philosophers, set such a value upon them, that they were the only tragedies he went to see acted; and yet his performances seldom gained the prize. Euripides frequently

Euripus,
Eurocly-
don.

ly intersperses through them moral sentences, and severe reflections on the fair sex; whence he was called the *Woman-hater*. He was, nevertheless, married: but the scandalous lives of his two wives drew upon him the raillery of Aristophanes, and other comic poets; which occasioned his retiring to the court of Archelaus, king of Macedon, where he was well received. That prince was fond of learned men, and drew them to him by his liberality. If we may believe Solinus, he made Euripides his minister of state, and gave him other extraordinary proofs of his esteem. He had, however, passed but a few years there, when an unhappy accident put an end to his life. He was walking in a wood, and, according to his usual manner, in deep meditation; when, unfortunately happening upon Archelaus's hounds, he was by them torn in pieces. It is not certain whether his death happened by chance, or through envy of some of the great courtiers. However, Archelaus buried him with great magnificence; and the Athenians were so much afflicted at his death, that the whole city went into mourning. Of 92 tragedies which he composed, only 19 are remaining: the most valuable editions of which are those of Aldus, in 1503, 8vo; of Plantin, in 1570, sexlesimo; of Commelin, in 1597, 8vo; of Paul Stevens, in 1604, 4to; and of Joshua Barnes, in 1764, folio.

EURIPUS, now the **NEGROPONT**, a canal or strait which divides the island of Eubœa from the continent of Greece. In one place it is so narrow, that a galley can scarce pass through it. The agitations of the Euripus were much spoken of by the ancients. Some say that the canal has a flux and reflux six times in 24 hours; others, that it ebbs and flows seven times a day; but Livy does not allow this flux and reflux to be so regular. Father Babin, a Jesuit of great learning, who made many observations on the spot during his long abode in the island of Negropont, tells us, that the Euripus is regular in its ebbing and flowing the first eight days of the moon: the same regularity he observed from the 14th to the 20th day inclusive, and in the three last days: but in the other days of the lunar month, it is not so regular; for it sometimes ebbs and flows 11, 12, 13, and 14 times in the space of a natural day. In this place, as the story commonly goes, Aristotle drowned himself out of chagrin, for not being able to account for so unusual a motion.

EURIPUS has since become a general name for all straits, where the water is in great motion and agitation.

The ancient circuses had their Euripi, which were no other than pits or ditches on each side of the course, into which it was very dangerous falling with their horses and chariots as they ran races. The term *euripus* was more particularly applied by the Romans to three canals or ditches which encompassed the circus on three sides, and which were filled occasionally to represent naumachia or sea-battles. The same people called their smaller fountains or canals in their gardens *euripuses*; and their largest, as cascades, &c. *niles*.

EUROCLYDON, (of *Ευρος* east-wind, and *κλυδων* wave,) is a species of wind, of which we have an account only in Acts xvii. 14. and concerning the nature of which critics have been much divided. Bochart, Grotius, Bentley, and others, substitute another read-

ing, supported by the Alexandrian MS. and the vulgate, viz. *Ευρακυλων*, or *Euro-aquillo*; but Mr Bryant defends the common reading, and considers the *Euroclydon*, i. e. *Ευρος κλυδων*, as an east wind that causes a deep sea or vast inundation. He maintains, in opposition to Dr Bentley's reasoning, who supposes that the mariners in the ship, the voyage of which is recited in this passage, were Romans, that they were Greeks of Alexandria, and that the ship was an Alexandrian ship employed in the traffic of carrying corn to Italy; and therefore, that the mariners had a name in their own language for the particular typhonic or stormy wind here mentioned. He also shews from the passage itself, that the tempestuous wind called *Euroclydon*, beat (*κατ' αутης*) upon the island of Crete; and therefore, as this is a relative expression, referring to the situation of the person who speaks of it, who was at that time to the windward or south of it, the wind blew upon shore, and must have come from the south or south-east; which, he adds is fully warranted by the point where the ship was, and the direction it ran in afterwards, which was towards the north and north-west.

EUROPA, in fab. hist. a daughter of Agenor king of Phenicia and Telephassa. She was so beautiful that Jupiter became enamoured of her, and the better to seduce her, he assumed the shape of a bull and mingled with the herds of Agenor, while Europa, with her female attendants were gathering flowers in the meadows. Europa caressed the beautiful animal; and at last had the courage to sit upon his back. The god took advantage of her situation; and with precipitate steps retired towards the shore, crossed the sea with Europa on his back, and arrived safe in Crete. Here he assumed his original shape, and declared his love. The nymph consented, though she had once made vows of perpetual celibacy; and she became mother of Minos, Sarpedon, and Rhadamanthus. After this distinguished amour with Jupiter, she married Asterius king of Crete. This monarch seeing himself without children by Europa, adopted the fruit of her amours with Jupiter, and always esteemed Minos, Sarpedon, and Rhadamanthus as his own children. Some suppose that Europa lived about 1552 years before the christian era.

EUROPE, one of the quarters of the world, bounded on the north by the Frozen Ocean, on the west by the Western Ocean, on the south by the Mediterranean, which separates it from Africa, and by the Archipelago, which divides it in part from Asia, as also by the Black Sea, then by the river Don, till it comes near the river Volga or Wolga, and then it is parted from Asia by this last, and afterwards by the river Oby. Europe is situated between Long. 9. 35. W. and 72. 25. E. and Lat. 35° and 72° N. It is about 3390 miles in length, from Cape St Vincent in Portugal, to the river Oby in Russia; and 2200 miles in breadth, from Cape Matapan, in the Morea, to the North Cape of Norway. We may judge by this, that it is much less than Asia and Africa: but it is in many things more considerable than both.

Europe, excepting a small part of Lapland and Muscovy, is situated in the temperate zone; insomuch, that we neither feel the extremities of heat nor cold. We cannot boast of rich mines of gold, silver, and precious stones; nor does it produce sugar or spices, nor yet

Europa,
Europe.

Europe yet elephants, camels, &c. which we can do without; but produces abundance of corn, pulse, fruits, animals, &c. the most necessary for the use of mankind. In general, it is better peopled and better cultivated than the other quarters; it is more full of cities, towns and villages, great and small, and its buildings are more solid and more commodious than those of Africa and Asia. The inhabitants are all white; and incomparably more handsome than the Africans, and even than most of the Asiatics. The Europeans surpass both in arts and sciences, especially in those called the *liberal*; in trade, navigation, and in military and civil affairs; being, at the same time more prudent, more valiant, more generous, more polite, and more sociable than they: and though we are divided into various sects, yet as Christians, we have infinitely the advantage over the rest of mankind. There are but few places in Europe where they sell each other for slaves; and none where robbery is a profession, as it is in Asia and Africa.

There are several sorts of governments in Europe; as the two empires of Germany and Russia, the kingdoms of England, France, Spain, Portugal, Denmark, Sweden, Poland, Prussia, Sardinia, and the Two Sicilies. The commonwealths are Holland, Switzerland, Venice, Genoa, Ragusa, Lucca, and Geneva. The dukedoms, Tuscany, Savoy, Modena, Mantua, Parma, and Courland, &c.

There are five sorts of religions in Europe, viz. the Mahomedan, which is professed in Turkey in Europe; the Greek, of which there are many in the same parts in all Muscovy, and in several parts of Polish Russia; the Roman Catholic in Spain, Portugal, France, and Italy; the Protestant, though with a considerable difference, in Great Britain, Denmark Sweden, and Norway. There is a mixture of both the last, in Ireland, Switzerland, Germany, Poland, Hungary, and the Low Countries: besides many Jews, and some idolaters in Lapland and the northern parts of Muscovy.

There are three general languages in Europe; the Latin, of which the Italian, the French, and the Spanish, are dialects; the Teutonic, which is spoken, tho' differently, in Germany, Hungary, Denmark, Sweden, and Great Britain; the Slavonic, which is spoken, tho' greatly disguised, in Muscovy, Poland, Bohemia and Turkey in Europe. There are some of less extent: as, the Greek; the proper Hungarian; the Basque; the British, which is spoken in Wales and Bretagne in France; the Irish; and the Laponic;

Europe may be divided into 11 great parts, including their dependencies: 1. Sweden; 2. Denmark and Norway; 3. Russia; 4. Poland; 5. Germany; 6. France; 7. Spain; 8. Italy; 9. Turkey in Europe; 10. Little Tartary; and, 11. The European islands, of which the chief are Great Britain and Ireland. The greatest cities in Europe are, London, Paris, Amsterdam, Constantinople, Moscow, and Rome.

EURYLE, in mythology, one of the Gorgons, daughter of Phoreys, and sister of Medusa: she was subject neither to old age nor death.

EURYANDRA, in botany; a genus of the trigynia order, belonging to the polyandria class of plants. The calyx is a pentaphyllous perianthium, with small, roundish and concave leaves; the corolla consists of three roundish hollow petals, longer than the calyx.

The stamina are very many capillary filaments much dilated at the apex; the pericarpium three egg-shaped follicles containing several seeds.

EURYDICE, in fab. hist. the wife of Orpheus, who, flying from Aristæus that endeavoured to ravish her, was slain by a serpent. Her husband went down to the shades, and by the force of his music persuaded Pluto and Proserpine to give him leave to carry back his wife; which they granted, provided he did not look on her till he came to the light; but he breaking the condition, was forced to leave her behind him. See **ORPHEUS**.

EURYMEDON, (anc. geog.) a noble river running through the middle of Pamphylia; famous for a sea and land fight on the same day, in which the Athenians, under Cimon the son of Miltiades, defeated the Persians. The sea-fight happened first in the sea of Pamphylia, towards Cyprus; the land engagement, the following night on the Eurymedon. Cimon, after defeating the Persian fleet armed his men with the armour of the captives, and set sail for the enemy, who lay on the banks of the Eurymedon, in the ships taken from the Persians; who on seeing their own ships and their own people in appearance, were off their guard, and thus became an easy conquest.

EURYSTHEUS, a king of Argos and Mycenæ, son of Sthenelus, and Nicippi the daughter of Pelops. Juno hastened his birth by two months, that he might come into the world before Hercules the son of Alcmena, as the younger of the two was doomed by order of Jupiter to be subservient to the will of the other. (*Vide* **ALCME**NA.) This natural right was cruelly exercised by Eurystheus, who was jealous of the fame of Hercules; and who to destroy so powerful a relation, imposed upon him the most dangerous and uncommon enterprises well known by the name of the *twelve labours of Hercules*. The success of Hercules in achieving those perilous labours alarmed Eurystheus in a greater degree, and he furnished himself with a brazen vessel, where he might secure himself a safe retreat in case of danger. After the death of Hercules, Eurystheus renewed his cruelties against his children, and made war against Ceyx king of Trachinia, because he had given them support, and treated them with hospitality. He was killed in the prosecution of this war by Hyllus the son of Hercules. His head was sent to Alcmena the mother of Hercules; who, mindful of the cruelties which her son had suffered, insulted it, and tore out the eyes with the most inveterate fury. Eurystheus was succeeded on the throne of Argos by Atreus his nephew. The death of Eurystheus happened about 30 years before the Trojan war.

EURYTHMY, in architecture, painting, and sculpture, is a certain majesty, elegance, and easiness, appearing in the composition of divers members or parts of a body, painting, or sculpture, and resulting from the fine proportion of it.

EUSDEN (Laurence), an Irish clergyman, rector of Conesby in Lincolnshire, and poet laureat after the death of Mr. Rowe. His first patron was the eminent lord Halifax; whose poem, on the battle of the Boyne, he translated into Latin, and dedicated to his lordship. He was esteemed by the duke of Newcastle, who rewarded an epithalamium he wrote on his marriage with the place of poet laureat. He was the author of many poetical

Eurydice
Eusden



Plate CLXXXVIII.



Eusebians poetical pieces, though but little known before his pre-
 ferment : he died in 1730.

Eusebians || **Eustathians** EUSEBIANS, a denomination given to the sect of
 Arians, on account of the favour and countenance
 which Eusebius, bishop of Cæsarea, showed and procu-
 red for them at their first rise. See ARIANS and EU-
 SEBIUS.

EUSEBIUS, surnamed PAMPHILUS, a celebrated
 bishop of Cæsarea in Palestine, and one of the most
 learned men of his time, was born in Palestine about
 the latter end of the reign of Gallienus. He was the
 intimate friend of Pamphilus the Martyr ; and, after
 his death, took his name in honour to his memory. He
 was ordained bishop of Cæsarea 313. He had a con-
 siderable share in the contest relating to Arius ; whose
 cause he, as well as several other bishops of Palestine,
 defended, being persuaded that Arius had been un-
 justly persecuted by Alexander bishop of Alexandria.
 He assisted at the Council of Nice in 325 ; when he
 made a speech to the emperor Constantine on his coming
 to the council, and was placed next him on his right
 hand. He was present at the council of Antioch, in
 which Eustathius bishop of that city was deposed ; but
 though he was chosen by the bishop and people of
 Antioch to succeed him, he absolutely refused it. In
 335, he assisted at the council of Tyre held against
 Athanasius ; and at the assembly of bishops at Jeru-
 salem, at the time of the dedication of the church there.
 By these bishops he was sent to the emperor Constan-
 tine to defend what they had done against Athanasius ;
 when he pronounced the panegyric made on that em-
 peror during the public rejoicings in the beginning of
 the 30th year of his reign, which was the last of his
 life. Eusebius survived the emperor but a short time,
 for he died in 338. He wrote, 1. An Ecclesiastical
 History, of which Valerius has given a good edition in
 Greek and Latin ; 2. The life of Constantine ; 3. A
 treatise against Hierocles ; 4. *Chronicon* ; 5. *Prepara-
 tiones Evangelicæ* ; 6. *De demonstratione Evangelica* ; of
 which there are but 10 books extant out of 20 ; and
 several other works, some of which are lost.

EUSTACHIUS (Bartholomew), physician and ana-
 tomist at Rome, flourished about the year 1550. His
 anatomical plates were discovered there in 1712, and
 published in 1714.

EUSTATHIANS, a name given to the Catholics
 of Antioch in the 4th century, on occasion of their re-
 fusal to acknowledge any other bishop besides St Eusta-
 thius, deposed by the Arians.

The denomination was given them during the epif-
 copate of Paulinus, whom the Arians substituted to St
 Eustathius, about the year 330, when they began to
 hold their assemblies apart. About the year 350,
 Leonius of Phrygia, called the *eunuch*, who was an
 Arian, and was put in the see of Antioch, desired
 the Eustathians to perform their service in his church ;
 which they accepting, the church of Antioch served
 indifferently both the Arians and Catholics.

This, we are told, gave occasion to two institutions,
 which have subsisted in the church ever since. The first
 was psalmody in two choirs ; though M. Baillet thinks,
 that if they instituted an alternate psalmody between
 two choirs, as was between two Catholic choirs, and
 not by way of response to an Arian choir. The se-

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cond was the doxology, *Glory be to the Father, and the
 Son and the Holy Ghost.* See DOXOLOGY.

This conduct, which seemed to imply a kind of com-
 munion with the Arians, gave great offence to abun-
 dance of Catholics, who began to hold separate meet-
 ings ; and thus formed the schism of Antioch. Upon
 this, the rest, who continued to meet in the church,
 ceased to be called *Eustathians*, and that appellation
 became restrained to the dissenting party. S. Flaviana-
 nus, bishop of Antioch in 381, and one of his succes-
 sors, Alexander, in 482, brought to pass a coalition, or
 reunion, between the Eustathians and the body of the
 church of Antioch, described with much solemnity by
 Theodoret, *Eccl.* l. iii. c. 2.

EUSTATHIANS were also a sect of heretics in the
 fourth century, denominated from their founder Eu-
 stathius, a monk so foolishly fond of his own profession,
 that he condemned all other conditions of life. Whe-
 ther this Eustathius was the same with the bishop of
 Sebastia and chief of the Semiarians, is not easy to
 determine.

He excluded married people from salvation ; pro-
 hibited his followers from praying in their houses ; and
 obliged them to quit all they had, as incompatible
 with the hopes of heaven. He drew them out of the
 other assemblies of Christians to hold secret ones with
 him, and made them wear a particular habit : he ap-
 pointed them to fast on Sundays ; and taught them, that
 the ordinary fasts of the church were needless, after they
 had attained to a certain degree of purity which he
 pretended to. He showed great horror for chapels built
 in honour of martyrs, and the assemblies held therein.
 Several women, seduced by his reasons, forsook their
 husbands, and abundance of slaves deserted their ma-
 sters houses. He was condemned at the council of
 Gangra in Paphlagonia, held between the years 326
 and 341.

EUSTATHIUS, bishop of Thessalonica, in the
 12th century, under the reigns of the emperors Ema-
 nuel, Alexander, and Andronicus Comnenus. He was
 a very eminent grammarian ; and wrote commentaries
 upon Homer, and Dionysius the geographer. The
 best edition of his Commentaries on Homer is that of
 Rome, printed in Greek, in 1542, in four volumes
 folio. His commentaries on the *Periegesis* of Diony-
 sius were printed by Mr Hudson at Oxford, in 1697,
 8vo. Eustathius appears to have been alive in the
 year 1194.

EUSTATIA, ST EUSTATIA, or *Eustatius*, one of the
 Caribbee islands, belonging to the Dutch, and situated in
 W. Long. 62. 56. N. Lat. 17. 29. It is little else than
 a huge mountain, which formerly has, in all probability,
 been a volcano. Its situation is so strong, that it has but
 one landing place ; and that is fortified in such a man-
 ner as to be almost impregnable. Tobacco is the chief
 product of the island ; and it is cultivated to the very
 top of the pyramid, which terminates in a large plain
 surrounded with woods, but having a hollow in the
 middle, which serves as a large den for wild beasts.
 No fewer than 5000 white people and 15,000 ne-
 groes subsist on this spot, where they rear hogs, kids,
 rabbits, and all kinds of poultry, in such abundance,
 that they can supply their neighbours, after having
 served themselves.

F

The

**Eusta-
 thians**
 |
Eustatia.

Eustatia.

The first Dutch colony sent to this island consisted of about 1600 people. They were dispossessed by the English from Jamaica in 1665. Soon after the Dutch and French became confederates, the English were expelled in their turn. The French continued to hold a garrison in the island till the treaty of Breda, when it was restored to the Dutch. Soon after the revolution, the French drove out the Dutch, and were in their turn driven out by the English under Sir Timothy Thornhill, with the loss of no more than eight men killed and wounded, though the fort they took mounted 16 guns and was in every other respect very strong. Sir Timothy found it necessary for the protection of the Dutch, to leave a small English garrison in the fort; but he granted the French no terms of capitulation, except for their lives and baggage. By the peace of Ryswic, the entire property of this island was restored to the Dutch.

This island was reduced by the British in the year 1781. Though not 20 miles in circumference, it abounded at that time with riches, by reason of the vast conflux of trade from every other island in these seas. Being a free port, it was open to all the subjects of the belligerent powers; and thus a communication was established among them, through which they were enabled to carry on a commercial correspondence, which greatly mitigated the inconveniences of war. The greatest benefit, however, was reaped by the Dutch; who, by transacting all trading business for other nations, were thus entrusted with numberless commissions, and likewise enjoyed vast profits from the sale of the merchandizes to which they were intitled. At the time the attack was made upon them, they were so little under any apprehensions of such an event, that their warehouses were not sufficient to contain the quantity of commercial articles imported for sale, and the beach and streets were covered with hogsheds of tobacco and sugar. In this situation, Admiral Rodney having received orders to commence hostilities against the Dutch, suddenly appeared before the island with such an armament of sea and land forces, as in its defenceless situation was not only useless but ridiculous. The governor could scarce credit the officer who summoned him to surrender; but being convinced how matters stood, the only possible step was taken, namely, to surrender the whole island, and every thing in it, at discretion. Along with the island there fell into the hands of the captors a ship of 60 guns, with 250 sail of merchantmen, while the value of property on the island was estimated at no less than four millions sterling. This capture became afterwards a subject of discussion in parliament, where the conduct of the British commanders was severely scrutinized by Mr Burke. The admiral and general made their defence in person: but the minority at that time were far from being satisfied; and it was supposed that on the change of ministry a rigid inquiry would have been set on foot, had not the splendor of Admiral Rodney's victory over de Grasse put an end to all thoughts of that nature.

The island of St Eustatius is naturally of such difficult access, as already observed, that it is almost impossible for an enemy to effect a landing if proper care is taken by those who are in possession of it. This very circumstance proved the ruin of the new possessors. The

British, secure in their inaccessible situation, conducted themselves in such a manner as induced the Marquis de Bouille to make an attempt to regain it. Having sailed from Martinico at the head of 2000 men, he arrived, on the 26th of November 1781, off one of the landing places of the island, which was deemed so inaccessible that it had been left without a guard. With much loss and difficulty, however, he landed here with four or five hundred of his people during the night. The appearance of day put an end to his landing any more; and he now saw himself obliged either to relinquish the enterprise or to attack the garrison, which was almost double the number of those he had on the island. He chose the latter; and was favoured in his enterprise by the extreme negligence of his antagonists. A difficult pass, which a few men might have occupied with success against a great number, was left unguarded, which the marquis secured in time, and then pushed forward with the utmost expedition. The British, mistaking a body of Irish troops which attended the French commander for their own comrades, suffered them to approach without thinking of opposing them. They were then exercising on the parade; but were soon made sensible of their fatal mistake by a close discharge from their supposed friends, by which many were killed and wounded. The surprise occasioned by this sudden attack was so great, that no resistance could be made; especially as their commanding officer, colonel Cockburn, who happened at that instant to come upon the parade, was made prisoner. A number of them, however, hastened to the fort with a view of making head against the enemy; but the French had already taken possession of the gate, and prevented the draw-bridge from being raised. They entered the fort; which, being surrendered by those who had taken shelter in it, the rest of the garrison dispersed in various places, and imagining the number of the enemy to be much greater than it really was, submitted without any opposition. The French commander took this opportunity of showing his disinterestedness in pecuniary matters. Among the spoils that fell into his hands a large sum of money was claimed by the British commanding officer as being his private property, which was generously restored to him: in like manner the property of the Dutch inhabitants was reserved to them, and nothing was allowed to be seized but the produce arising from the sale of prizes that had been taken by the British when they captured the island.

EUSTYLE, in architecture, a sort of building in which the pillars are placed at the most convenient distance one from another, the intercolumniations being just two diameters and a quarter of the column, except those in the middle of the face, before and behind, which are three diameters distant.

EUTERPE, one of the muses, daughter of Jupiter and Mnemosyne. She presided over music, and was looked upon as the inventress of the flute. She is represented as crowned with flowers and holding a flute in her hands: Some mythologists attributed to her the invention of tragedy, more commonly supposed to be the production of Melpomene.

EUTHYMIA, among the Greeks, signified such a disposition, or state of the mind, as could not be ruffled either by good or bad fortune, by sickness or health, good or evil.

Eustatius
|
Euthymia.

EU-

Eutropius
Eutychians.

EUTROPIUS (Flavius), a Latin author, in the 4th century, was secretary to Constantine the Great, and afterwards bore arms under the emperor Julian, and followed that prince in his expedition against the Persians. He wrote an Abridgment of the Roman History from the foundation of Rome to the reign of Valens; the best edition of which is that of Miss Le Fevre, afterwards Madam Dacier, published at Paris for the use of the Dauphin, in 4to, in the year 1683.

EUTYCHIANS, ancient heretics, who denied the duplicity of natures in Christ; thus denominated from Eutyches, the archimandrite, or abbot of a monastery at Constantinople, who began to propagate his opinion A. D. 448. He did not, however, seem quite steady and consistent in his sentiments: for he appeared to allow of two natures, even before the union; which was apparently a consequence he drew from the principles of the Platonic philosophy, which supposes a pre-existence of souls: accordingly he believed that the soul of Jesus Christ had been united to the divinity before the incarnation; but then he allowed no distinction of natures in Jesus Christ since his incarnation. This heresy was first condemned in a synod held at Constantinople by Flavian, in 448, approved by the council of Ephesus, called *conventus latronum*, in 449, and re-examined, and fulminated in the general council of Chalcedon in 451. The legates of Pope Leo, who assisted at it, maintained that it was not enough to define, that there were two natures in Jesus Christ, but insisted strenuously, that, to remove all equivocations, they must add these terms, without being changed, or confounded, or divided.

The heresy of the Eutychians, which made a very great progress throughout the east, at length became divided into several branches. Nicephorus makes mention of no fewer than twelve: some called *Schematici*, or *Apparentes*, as only attributing to Jesus Christ a phantom or appearance of flesh, and no real flesh: others, *Theodosians*, from Theodosius bishop of Alexandria: others, *Jacobites*, from one James (*Jacobus*), of Syria; which branch established itself principally in Armenia, where it still subsists. Others were called *Acephali*, *q. d.* without head; and *Severians*, from a monk called *Severus*, who seized on the see of Antioch in 513. These last were subdivided into five factions, *viz.* *Agnotæ*, who attributed some ignorance to Jesus Christ; the followers of Paul; *Μελαιροι*, that is, the black *Angelites*, thus called from the place where they were assembled; and lastly, *Adrites* and *Cononites*.

EUTYCHIANS was also the name of another sect, half Arian half Eunomian; which arose at Constantinople in the fourth century.

It being then a matter of mighty controversy among the Eunomians at Constantinople, whether or no the Son of God knew the last day and hour of the world, particularly with regard to that passage in the gospel of St Matthew, chap. xxiv. ver. 36. or rather that in St Mark, xiii. 32. where it is expressed, that the Son did not know it, but the Father only; Eutychius made no scruple to maintain, even in writing, that the Son did not know it; which sentiment displeasing the leaders of the Eunomian party, he separated from them, and made a journey to Eunomius, who was then in exile.—That heretic acquiesced fully in Eutychius's

doctrine, and admitted him to his communion. Euno- Eutychius
mius dying soon after, the chief of the Eunomians at Constantinople refused to admit Eutychius; who, upon this, formed a particular sect of such as adhered to him, called *Eutychians*.

This same Eutychius, with one Theophrastus, a was said in Sozomen's time, were the occasions of all the changes made by the Eunomians in the administration of baptism; which consisted, according to Nicephorus, in only using one immersion, and not doing it in the name of the Trinity, but in memory of the death of Jesus Christ. Nicephorus calls the chief of that sect, not *Eutychius*, but *Eupsychius*, and his followers *Eunomiaupsychians*.

EUTYCHIUS patriarch of Alexandria, lived about the ninth age; and wrote annals in the Arabic language, printed at Oxford in 1658, with a Latin version by Mr Pocock. Seldon had printed something of his before.

EUXINE or **BLACK SEA**, forms part of the boundary betwixt Europe and Asia. It receives the Nieper, the Danube, and other large rivers; and extends from 8 to 40 degrees of E. Long. and from 40 to 46. N. Lat. The ancients imagined this sea to have been originally only a lake or standing pool which broke first into the Propontis, and then into the Egean, washing away by degrees the earth which first kept it within bounds, and formed the two channels of the Bosphorus Thracius and Hellespont, now the Dardanelles.—It was anciently called the *Axenus*, supposed to be from Ashkenaz the son of Gomer, who is said to have settled near it. This original being forgot in length of time, the Greeks explained it by *inhospitable*, which the word Axenos literally signifies; and therefore, when they came to consider the inhabitants of these coasts as more civilized and hospitable, they changed the name into Euxinus, which it still retains.

EWE, the English name of a female sheep. See **Ovis**.

EWERY, in the British customs, an office in the king's household, to which belongs the care of the table linen, of laying the cloth, and serving up water in silver ewers after dinner.

EX, a river that rises in a barren tract of land, called Exmore, in Somersetshire; and after being joined by several little streams, runs by Tiverton, where there is a stone bridge over the river. About nine miles below Tiverton, it is joined by a pretty large stream called the *Colombton*; and about two miles lower, by another stream formed by the junction of the Horton and Credy. With these additions it washes the walls of Exeter. At Topsham, above four miles below Exeter, it receives another considerable addition to its stream; two miles farther, it is joined by the Ken; and falls into the ocean at Exmouth, after a course of about 40 miles. Ships of great burden go up to Topsham, from whence vessels of 150 tons are conveyed to the quay at Exeter, by means of an artificial canal. The Ex is navigable for vessels of considerable burden to Topsham. The passage, however, at the mouth of the river, is but narrow, having rocks on the east-side and broad sands on the west; nor is the water on the bar more than six or seven feet deep at low water, but the tide rises 14 or 15 feet, so that it is deep enough at highwater. When ships are within the

Ex officio bar, they may ride afloat at a place called Starcross, about a mile and an half from the river's mouth; but those that go to Topsham lie aground on the ooze at low water.

Exaltation.

EX OFFICIO, among lawyers, signifies the power a person has, by virtue of his office, to do certain acts without being applied to. Thus a justice of peace may *ex officio*, at his discretion, take surety of the peace, without complaint made by any person whatsoever.

There was formerly an oath *ex officio*, whereby a supposed offender was compelled in the ecclesiastical court to confess, accuse, or clear himself of a crime; but this law is repealed.

Ex post Facto, in law, something done after another: thus an estate granted may be good by matter *ex post facto*, that was not so at first, as in case of election.

EXACERBATION. See PAROXYSM.

EXACTION, in law, a wrong done by an officer, or a person in pretended authority, in taking a reward or fee that is not allowed by law.

A person guilty of exaction may be fined and imprisoned. It is often confounded with EXTORTION.

EXACUM, in botany: A genus of the monogynia order, belonging to the tetrandria class of plants; and in the natural method ranking under the 20th order, *Rotaceæ*. The calyx is tetraphyllous; the corolla quadrid, with the tube globular; the capsule two-furrowed, bilocular, polyspermous, and opening at the top.

EXÆRESIS, in surgery, the operation of the extracting or taking away something that is hurtful to the human body.

EXAGGERATION, in rhetoric, a kind of hyperbole, whereby things are augmented or amplified, by saying more than the truth, either as to good or bad.

EXAGGERATION, in painting, a method by which the artist, in representing things, changes them too much, or makes them too strong, either in respect of the design or colouring. It differs from *caricaturing*, in that the latter perverts or gives a turn to the features of a face, &c. which they had not; whereas exaggeration only heightens or improves what they had.

EXALTATION, or **ELEVATION**, is chiefly used in a figurative sense for the raising or advancing a person to some ecclesiastical dignity; and particularly to the papacy.

EXALTATION of the Cross, is a feast of the Romish church, held on the 14th of September; in memory, as is generally supposed, of this, that the emperor Heraclius brought back the true cross of Jesus Christ on his shoulders, to the place on mount Calvary, from which it had been carried away 14 years before by Cosroes king of Persia, at his taking of Jerusalem, under the reign of the emperor Phocas. The cross was delivered up by a treaty of peace made with Siroe, Cosroes's son. The institution of this treaty is commonly said to have been signalized by a miracle; in that Heraclius could not stir out of Jerusalem with the cross, while he had the imperial vestments on enriched with gold and precious stones, but bore it with ease in a common dress.

But long before the empire of Heraclius, there had

been a feast of the same denomination observed both in the Greek and Latin churches, on occasion of what our Saviour said in St John xii. 32. *And I, if I be exalted, or lifted up, will draw all men unto me.* And again, in ch. viii. ver. 28. *When you have exalted, or lifted up, the Son of Man, then shall ye know that I am he.*

The feast of the dedication of the temple built by Constantine was held, says Nicephorus, on the 14th of September, the day on which the temple had been consecrated, in the year 335; and this feast was also called the *exaltation of the cross*, because it was a ceremony therein, for the bishop of Jerusalem to ascend a high place built by Constantine for that purpose, in manner of a pulpit, called by the Greeks the *sacred mysteries of God*, or the *holiness of God*, and there hoist up the cross, for all the people to see it.

EXALTATION, in physic, denotes the act, or operation, of elevating, purifying, subtilizing, or perfecting any natural body, its principles and parts; also the quality or disposition which bodies acquire by such operation. The term *exaltation* has been peculiarly affected by the chemists and alchemists, who, imagining it to have some extraordinary emphasis, are employing it on every occasion.

EXALTATION, in astrology, is a dignity which a planet acquires in certain signs or parts of the zodiac; which dignity is supposed to give it an extraordinary virtue, efficacy and influence. The opposite sign, or part of the zodiac, is called the dejection of the planet. Thus the 15th degree of Cancer is the exaltation of Jupiter, according to Albumazar, because it was the ascendant of that planet at the time of the creation; that of the sun is in the 19th degree of Aries, and its dejection in Libra; that of the moon is in Taurus, &c. Ptolemy gives the reason of this in his first book de Quadrup.

EXAMINATION, an exact or careful search or inquiry in order to discover the truth or falsehood of a thing.

Self-EXAMINATION is a point much insisted on by divines, and particularly the ancient fathers, by way of preparation to repentance. St Ignatius reduces it to five points, viz. 1. A returning thanks to God for his benefits. 2. A begging of grace and light, to know and distinguish our sins. 3. A running over all our actions, occupations, thoughts, and words, in order to learn what has been offensive to God. 4. A begging of pardon, and conceiving a sincere sorrow for having displeased him. And, 5. Making a firm resolution not to offend him any more; and taking the necessary precautions to preserve ourselves from it.

EXAMINERS, in chancery, two officers of that court, who examine, upon oath, witnesses produced in causes depending there, by either the complainant or defendant, where the witnesses live in London or near it. Sometimes parties themselves, by particular order, are examined. In the country, above 20 miles from London on the parties joining in commission, witnesses are examined by commissioners, being usually counsellors or attorneys not concerned in the cause.

EXAMPLE, in a general sense, denotes a copy or a pattern.

EXAMPLE, in a moral sense, is either taken for a type, instance, or precedent, for our admonition, that we may be cautioned against the faults or crimes which others

Exaltation

Example.

Example
||
Exarch.

others have committed, by the bad consequences which have ensued from them; or example is taken for a pattern for our imitation or a model for us to copy after.

That examples have a peculiar power above the naked precept to dispose us to the practice of virtue and holiness, may appear, by considering, 1. That they most clearly express to us the nature of our duties in their subjects and sensible effects. General precepts form abstract ideas of virtue; but in examples, virtues are most visible in all their circumstances. 2. Precepts instruct us in what things are our duty; but examples assure us that they are possible. When we see men like ourselves, who are united to frail flesh, and in the same condition with us, to command their passions, to overcome the most glorious and glittering temptations, we are encouraged in our spiritual warfare. 3. Examples, by secret and lively incentive, urge us to imitation. We are touched in another manner by the visible practice of good men, which reproaches our defects, and obliges us to the same zeal which laws, though wise and good, will not effect.

The example of our Saviour is most proper to form us to holiness: it being absolutely perfect, and accommodated to our present state. There is no example of a mere man that is to be followed without limitation: But the example of Christ is absolutely perfect; his conversation was a living law: "He was holy, harmless, undefiled, and separate from sinners."

EXAMPLE, in rhetoric, denotes an imperfect kind of induction or argumentation; whereby it is proved, that a thing which happened on some other occasion will happen again on the present one, from the similitude of the cases. As, "The war of the Thebans, against their neighbours the Phocians, was ruinous; consequently, that of the Athenians against their neighbours, will likewise be fatal."

EXANTHEMA, among physicians, denotes any kind of efflorescence or eruption, as the measles, purple spots in the plague, or malignant fevers, &c.

EXARCH, in antiquity, an appellation given, by the emperors of the east, to certain officers sent into Italy, in quality of vicars, or rather prefects, to defend that part of Italy which was yet under their obedience; particularly the city of Ravenna against the Lombards, who had made themselves masters of the greatest part of the rest.

The residence of the exarch was at Ravenna; which city, with that of Rome, were all that was left the emperors. The first exarch was the patrician Boetius, famous for his treatise, *De Consolatione Philosophiæ*; appointed in 568 by the younger Justin. The exarchs subsisted about 185 years, and ended in Eutychius; under whose exarchate the city of Ravenna was taken by the Lombard king Astolphus, or Astolphus.

The emperor Frederic created Heraclius, archbishop of Lyons, a descendant of the illustrious house of Montboissier, exarch of the whole kingdom of Burgundy; a dignity till that time unknown any where but in Italy, particularly in the city of Ravenna.

Homer, Philo, and other ancient authors, give likewise the name *exarchus* to the choragus or master of the singers, in the ancient choruses, or him who sang first: the word *αρχω* or *αρχουσ* signifying equally to begin, and to command.

EXARCH of a *Diocese* was, anciently, the same with primate. This dignity was inferior to the patriarchal, yet greater than the metropolitan.

EXARCH also denotes an officer, still subsisting in the Greek church; being a kind of deputy or legate *à latere* of the patriarch, whose office it is to visit the provinces allotted him, in order to inform himself of the lives and manners of the clergy; take cognizance of ecclesiastical causes; the manner of celebrating divine service; the administration of the sacraments, particularly confession; the observance of the canons; monastic discipline; affairs of marriages, divorces, &c. but, above all, to take an account of the several revenues which the patriarch receives from several churches; and particularly, as to what regards the collecting the same.

The exarch, after having greatly enriched himself in his post, frequently rises to the patriarchate itself.

EXARCH is also used, in the eastern church antiquity, for a general or superior over several monasteries; the same that we otherwise call archimandrite; being exempted, by the patriarch of Constantinople, from the jurisdiction of the bishops; as are now the generals of the Romish monastic orders.

EXAUCTORATIO, in the Roman military discipline, differed from the *missio*, which was a full discharge, and took place after they had served in the army 20 years; whereas the *exauctoratio* was only a partial discharge: they lost their pay indeed, but still kept under their colours or *vexilla*, though not under the *aquila* (or eagle), which was the standard of the legion: whence, instead of *Legionarii*, they were called *Subsignarii*, and were retained till they had either served their full time, or had lands assigned them. The *exauctoratio* took place after they had served 17 years.

EXCALCEATION, among the Hebrews, was a particular law, whereby a widow, whom her husband's brother refused to marry, had a right to summon him to a court of justice; and, upon his refusal, might excalceate him, that is, pull off one of his shoes, and spit in his face; both of them actions of great ignominy.

EXCELLENCY, a title anciently given to kings and emperors, but now to ambassadors, generals, and other persons who are not qualified for that of *highness*, and yet are to be elevated above the other inferior dignities.

EXCENTRIC, in geometry, a term applied to circles and spheres which have not the same centre, and consequently are not parallel; in opposition to concentric, where they are parallel, having one common centre.

EXCENTRICITY, in astronomy, is the distance of the centre of the orbit of a planet from the centre of the sun; that is the distance between the centre of the ellipsis and the focus thereof.

EXCEPTION, something reserved or set aside, and not included in a rule.

It is become proverbial, that there is no rule without an exception; intimating that it is impossible to comprehend all the particular cases, under one and the same maxim. But it is dangerous following the exception preferably to the rule.

EXCEPTION, in law, denotes a stop or stay to an action; and is either dilatory or peremptory, in proceedings

Exarch
|
Exception.

Except proceedings at common law; but in chancery it is what the plaintiff alleges against the sufficiency of an answer, &c.

Exchange.

An exception is no more than the denial of what is taken to be good by the other party, either in point of law or pleading. The counsel in a cause are to take all their exceptions to the record at one time, and before the court has delivered any opinion of it.

EXCERPT, in matters of literature. See EXTRACT.

EXCESS, in arithmetic and geometry, is the difference between any two unequal numbers or quantities, or that which is left after the lesser is taken from or out of the greater.

EXCHANGE, in a general sense, a contract or agreement, whereby one thing is given or exchanged for another.

EXCHANGE, in commerce, is the receiving or paying of money in one country for the like sum in another, by means of bills of exchange.

The security which merchants commonly take from one another when they circulate their business, is a bill of exchange, or a note of hand: these are looked upon as payment. See BILL, and *Mercantile LAWS*.

The punctuality of acquitting these obligations is essential to commerce; and no sooner is a merchant's accepted bill protested, than he is considered as a bankrupt. For this reason, the laws of most nations have given very extraordinary privileges to bills of exchange. The security of trade is essential to every society; and were the claims of merchants to linger under the formalities of courts of law when liquidated by bills of exchange, faith, confidence, and punctuality, would quickly disappear, and the great engine of commerce would be totally destroyed.

A regular bill of exchange is a mercantile contract, in which four persons are concerned, viz. 1. The drawer, who receives the value: 2. His debtor, in a distant place, upon whom the bill is drawn, and who must accept and pay it; 3. The person who gives value for the bill, to whose order it is to be paid: and, 4. The person to whom it is ordered to be paid, creditor to the third.

By this operation, reciprocal debts, due in two distant parts, are paid by a sort of transfer, or permutation of debtors and creditors.

(A) in London is creditor to (B) in Paris, value 100 l. (C) again in London is debtor to (D) in Paris for a like sum. By the operation of the bill of exchange, the London creditor is paid by the London debtor; and the Paris creditor is paid by the Paris debtor; consequently, the two debts are paid, and no money is sent from London to Paris nor from Paris to London.

In this example, (A) is the drawer, (B) is the acceptor, (C) is the purchaser of the bill, and (D) receives the money. Two persons here receive the money, (A) and (D); and two pay the money, (B) and (C); which is just what must be done when two debtors and two creditors clear accounts.

This is the plain principle of a bill of exchange. From which it appears, that reciprocal and equal debts only can be acquitted by them.

When it therefore happens, that the reciprocal debts of London and Paris (to use the same example) are

not equal, there arises a balance on one side. Suppose London to owe Paris a balance, value 100 l. How can this be paid? Answer, It may either be done with or without the intervention of a bill.

With a bill, if an exchanger, finding a demand for a bill upon Paris for the value of 100 l. when Paris owes no more to London, sends 100 l. to his correspondent at Paris in coin, at the expense (suppose) of 1 l. and then, having become creditor on Paris, he can give a bill for the value of 100 l. upon his being repaid his expense, and paid for his risk and trouble.

Or it may be paid without a bill, if the London debtor sends the coin himself to his Paris creditor, without employing an exchanger.

This last example shows of what little use bills are in the payment of balances. As far as the debts are equal, nothing can be more useful than bills of exchange; but the more they are useful in this easy way of business, the less profit there is to any person to make a trade of exchange, when he is not himself concerned either as debtor or creditor.

When merchants have occasion to draw and remit bills for the liquidation of their own debts, active and passive, in distant parts, they meet upon 'Change; where to pursue the former example, the creditors upon Paris, when they want money for bills, look out for those who are debtors to it. The debtors to Paris again, when they want bills for money, seek for those who are creditors upon it.

This market is constantly attended by brokers, who relieve the merchant of the trouble of searching for those he wants. To the broker every one communicates his wants, so far as he finds it prudent; and by going about among all the merchants, the broker discovers the side upon which the greater demand lies, for money or for bills.

He who is the demander in any bargain, has constantly the disadvantage in dealing with him of whom he demands. This is no where so much the case as in exchange, and renders secrecy very essential to individuals among the merchants. If the London merchants want to pay their debts to Paris, when there is a balance against London, it is their interest to conceal their debts, and especially the necessity they may be under to pay them; from the fear that those who are creditors upon Paris would demand too high a price for the exchange over and above par.

On the other hand, those who are creditors upon Paris, when Paris owes a balance to London, are as careful in concealing what is owing to them by Paris, from the fear that those who are debtors to Paris would avail themselves of the competition among the Paris creditors, in order to obtain bills for their money, below the value of them, when at par. A creditor upon Paris, who is greatly pressed for money at London, will willingly abate something of his debt, in order to get one who will give him money for it.

From the operation carried on among merchants upon 'Change, we may discover the consequence of their separate and jarring interests. They are constantly interested in the state of the balance. Those who are creditors on Paris, fear the balance due to London; those who are debtors to Paris, dread a balance due to Paris. The interest of the first is to dissemble what they fear; that of the last, to exaggerate what they wish

Exchange. with. The brokers are those who determine the course of the day; and the most intelligent merchants are those who dispatch their business before the fact is known.

Now, how is trade in general interested in the question, Who shall outwit, and who shall be outwitted, in this complicated operation of exchange among merchants?

The interest of trade and of the nation is principally concerned in the proper method of paying and receiving the balances. It is also concerned in preserving a just equality of profit and loss among all the merchants, relative to the real state of the balance. Unequal competition among men engaged in the same pursuit, constantly draws along with it bad consequences to the general undertaking; and secrecy in trade will be found, upon examination, to be much more useful to merchants in their private capacity, than to the trade they are carrying on.

Merchants endeavour to simplify their business as much as possible; and commit to brokers many operations which require no peculiar talents to execute. This of exchange is of such a nature, that it is hardly possible for a merchant to carry on the business of his bills, without their assistance, upon many occasions. When merchants come upon 'Change, they are so full of fear and jealousies, that they will not open themselves to one another, lest they should discover what they want to conceal. The broker is a confidential man, in some degree, between parties, and brings them together.

Besides the merchants who circulate among themselves their reciprocal debts and credits arising from their importation and exportation of goods, there is another set of merchants who deal in exchange; which is the importation and exportation of money and bills.

Were there never any balance on the trade of nations, exchangers and brokers would find little employment: reciprocal and equal debts would easily be transacted openly between the parties themselves. No man feigns and dissembles, except when he thinks he has an interest in so doing.

But when balances come to be paid, exchange becomes intricate; and merchants are so much employed in particular branches of business, that they are obliged to leave the liquidation of their debts to a particular set of men, who make it turn out to the best advantage to themselves.

Exchange. Whenever a balance is to be paid, that payment costs, as we have seen, an additional expence to those of the place who owe it, over and above the value of the debt.

If, therefore, this expence be a loss to the trading man, he must either be repaid this loss by those whom he serves, that is, by the nation; or the trade he carries on will become less profitable.

Every one will agree, that the expence of high exchange upon paying a balance is a loss to a people, no way to be compensated by the advantages they reap from enriching the few individuals among them who gain by contriving methods to pay it off; and if an argument is necessary to prove this proposition, it may be drawn from this principle, viz. whatever renders the profit upon trade precarious or uncertain, is a loss to trade in general: this loss is the consequence of high exchange; and although a profit does result from it upon one branch of trade, the exchange-business, yet that cannot compensate the loss upon every other.

We may, therefore, here repeat what we have said above, that the more difficulty is found in paying a balance, the greater is the loss to a nation.

The Course of Exchange.

THE course of exchange is the current price betwixt two places, which is always fluctuating and unsettled, being sometimes above and sometimes below par, according to the circumstances of trade.

When the course of exchange rises above par, the country where it rises may conclude for certain, that the balance of trade runs against them. The truth of this will appear, if we suppose Britain to import from any foreign place goods to the value of 100,000*l.* at par, and export only to the value of 80,000*l.* In this case, bills on the said foreign place will be scarce in Britain, and consequently will rise in value; and after the 80,000*l.* is paid, bills must be procured from other places at a high rate to pay the remainder, so that perhaps 120,000*l.* may be paid for bills to discharge a debt of 100,000*l.*

Though the course of exchange be in a perpetual flux, and rises or falls according to the circumstances of trade; yet the exchanges of London, Holland, Hamburg, and Venice, in a great measure regulate those of all other places in Europe.

I. Exchange with Holland.

M O N E Y - T A B L E .

		<i>Par in Sterling.</i>	<i>s.</i>	<i>d.</i>
8 Pennings, or 2 duytes,	} make	1 groat or penny =	0	0 54
2 Groats, or 16 pennings,		1 stiver =	0	1.09
6 Stivers, or 12 pence,		1 schilling =	0	6.56
20 Schillings,		1 pound Flemish =	10	11.18
20 Stivers, or 40 pence,		1 gilder or florin =	1	9.86
6 Guilders, or florins,		1 pound Flemish =	10	11.18
2½ Guilders, or florins,		1 rix dollar =	4	6.66

In Holland there are two sorts of money, bank and current. The bank is reckoned good security; demands on the bank are readily answered; and hence bank money is generally rated from 3 to 6 *per cent.*

better than the current. The difference between the bank and current money is called the *agio*.

Bills on Holland are always drawn in bank-money; and if accounts be sent over from Holland to Britain in current

Exchange. current money, the British merchant pays these accounts by bills, and in this case has the benefit of the agio.

PROB. I. To reduce bank-money to current money.

RULE. As 100 to 100+agio, so the given guilders to the answer.

EXAMP. What will 2210 guilders in bank-money amount to in Holland currency, the agio being 3 $\frac{1}{4}$ per cent?

Guild.

As 100 :	103 $\frac{1}{4}$:	2210
8	8	825
800	825	11050
		4420
		17680

Guild. fl. pen.

8 00	18232 50	(2279	1	4	cur.
	16	...	20		
22	10 00	(			
16	8				
63	2				
56	16				
72	32				
72	32				

Or, by practice,

50)2210	
44.2	= 2 per cent.
22.1	= 1 per cent.
7.7625	= $\frac{1}{4}$ per cent.
2279.0625	

If the agio only be required, make the agio the middle term, thus:

As 100 : 3 $\frac{1}{4}$: : 2210 : 69 1 4 agio. Or, work by practice, as above.

PROB. II. To reduce current money to bank-money.

RULE. As 100+agio to 100, so the given guilders to the answer.

EXAMPLE. What will 2279 guilders 1 stiver 4 pennings, Holland currency, amount to in bank-money, the agio being 3 $\frac{1}{4}$ per cent?

Guild. Guild. Guild. fl. pen.

As 103 $\frac{1}{4}$:	100 :	2279 1 4
8	8	20
825	800	45581
20		16
16500		273490
16		45581
990		729300
165		800
8)264 000	8)583440 000	
3)33	3)72930	Guild.
11	11)24310	(2210 bank.

Exchange. In Amsterdam, Rotterdam, Middleburgh, &c. books and accounts are kept by some in guilders stivers and pennings, and by others in pounds shillings and pence Flemish.

Britain gives 1l. Sterling for an uncertain number of shillings and pence Flemish. The par is 1l. Sterling for 36.59s. Flemish; that is 1 l. 16 s. 7.08 d. Flemish.

When the Flemish rate rises above par; Britain gains and Holland loses by the exchange, and *vice versa*.

Sterling money is changed into Flemish, by saying,

As 1 l. Sterling to the given rate,

So is the given Sterling to the Flemish sought.

Or, the Flemish money may be cast up by practice.

Dutch money, whether pounds, shillings, pence Flemish, or guilders, stivers, pennings, may be changed into Sterling, by saying,

As the given rate to 1 l. Sterling,

So the given Dutch to the Sterling sought.

EXAMPLE. I. A merchant in Britain draws on Amsterdam for 782 l. Sterling: How many pounds Flemish, and how many guilders, will that amount to, exchange at 34s. 8d. per pound Sterling?

Decimally.

<table style="margin-left: auto; margin-right: auto;"> <tr> <td>L.</td> <td>s.</td> <td>d.</td> <td>L.</td> </tr> <tr> <td>If 1 :</td> <td>34 8 :</td> <td>782</td> <td></td> </tr> <tr> <td></td> <td>12</td> <td></td> <td></td> </tr> <tr> <td colspan="4"> </td> </tr> <tr> <td></td> <td>416</td> <td></td> <td></td> </tr> <tr> <td></td> <td>782</td> <td></td> <td></td> </tr> <tr> <td colspan="4"> </td> </tr> <tr> <td></td> <td>832</td> <td></td> <td></td> </tr> <tr> <td></td> <td>3328</td> <td></td> <td></td> </tr> <tr> <td></td> <td>2912</td> <td></td> <td></td> </tr> <tr> <td colspan="4"> </td> </tr> <tr> <td>12)325312</td> <td></td> <td></td> <td></td> </tr> <tr> <td>2 0</td> <td>2710 9 4</td> <td></td> <td></td> </tr> <tr> <td colspan="4"> </td> </tr> <tr> <td>L.</td> <td>1355 9 4</td> <td>Flem.</td> <td></td> </tr> </table>	L.	s.	d.	L.	If 1 :	34 8 :	782			12								416				782								832				3328				2912							12)325312				2 0	2710 9 4							L.	1355 9 4	Flem.		<table style="margin-left: auto; margin-right: auto;"> <tr> <td>L.</td> <td>s.</td> <td>L.</td> </tr> <tr> <td>If 1 :</td> <td>34.6 :</td> <td>782</td> </tr> <tr> <td></td> <td>782</td> <td></td> </tr> <tr> <td colspan="3"> </td> </tr> <tr> <td></td> <td>693</td> <td></td> </tr> <tr> <td></td> <td>27733</td> <td></td> </tr> <tr> <td></td> <td>242666</td> <td></td> </tr> <tr> <td colspan="3"> </td> </tr> <tr> <td>2 0</td> <td>2710 9.3</td> <td></td> </tr> <tr> <td colspan="3"> </td> </tr> <tr> <td>L.</td> <td>1355 9 4</td> <td>Flem.</td> </tr> </table>	L.	s.	L.	If 1 :	34.6 :	782		782						693			27733			242666					2 0	2710 9.3					L.	1355 9 4	Flem.
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By practice.

L.	s.	d.
782		
10s. = $\frac{1}{4}$	391	
4s. = $\frac{1}{2}$	156 8	
8d. = $\frac{3}{4}$	26 1 4	
1355 9 4	Flem.	

Or thus:

L.	s.	d.
782		
14s. = $\frac{7}{8}$	547 8	
8d. = $\frac{1}{2}$	26 1 4	
1355 5 4	Flem.	

Multiply the Flemish pounds and shillings by 6, and the product will be guilders and stivers; and if there be any pence, multiply them by 8 for pennings; or, divide the Flemish pence by 40, and the quot will be guilders, and the half of the remainder, if there be any, will be stivers, and one penny odd will be half a stiver, or 8 pennings, as follows:

<table style="margin-left: auto; margin-right: auto;"> <tr> <td>L.</td> <td>s.</td> <td>d.</td> </tr> <tr> <td>1355 9 4</td> <td></td> <td></td> </tr> <tr> <td>6</td> <td></td> <td></td> </tr> <tr> <td colspan="3"> </td> </tr> <tr> <td>Guild.</td> <td>8132</td> <td>16 stiv.</td> </tr> </table>	L.	s.	d.	1355 9 4			6						Guild.	8132	16 stiv.	<table style="margin-left: auto; margin-right: auto;"> <tr> <td>Flem. pence.</td> </tr> <tr> <td>4 0)32531 2(32 rem.</td> </tr> <tr> <td colspan="2"> </td> </tr> <tr> <td>Guild.</td> <td>8132 16 stiv.</td> </tr> </table>	Flem. pence.	4 0)32531 2(32 rem.			Guild.	8132 16 stiv.
L.	s.	d.																				
1355 9 4																						
6																						
Guild.	8132	16 stiv.																				
Flem. pence.																						
4 0)32531 2(32 rem.																						
Guild.	8132 16 stiv.																					

2. Change 591 l. 5s. Flemish into Sterling money, exchange at 37s. 6d. Flemish per 1. Sterling.

Exchange.

EXC

Flem. Ster. Flem.
s. d. L. L. s.

If 37 6 : 1 :: 591 5

2 20

5) 75 11025

4) 15 2

5) 23650

5) 4730

3) 946

L. s. d. 315 5 8

Ans. 315 5 8 Ster.

Decimally.
5) L. L. 5) L.

If 1.875 : 1 :: 591.25

5) .275 5) 118.25

5) .075 5) 23.65

.015 .015) 4.73(313.3

45

23

15

80

75

50

45

*5

Holland exchanges with other nations as follows,
viz. with

	Flem. d.
Hamburgh, on the dollar,	= 66 $\frac{2}{3}$
France, on the crown,	= 54
Spain, on the ducat,	= 109 $\frac{1}{3}$
Portugal, on the crusade,	= 50
Venice, on the ducat,	= 93
Genoa, on the pezzo,	= 100
Leghorn, on the piastra,	= 100
Florence, on the crown,	= 120
Naples, on the ducat	= 74 $\frac{1}{2}$
Rome, on the crown,	= 136
Milan, on the ducat,	= 102
Bologna, on the dollar,	= 94 $\frac{1}{2}$

Exchange between Britain and Antwerp, as also the Austrian Netherlands, is negotiated the same way as with Holland; only the par is somewhat different, as will be described in article 2d, following.

II. Exchange with Hamburgh.

MONEY-TABLE.

	Par in Sterling,	s.	d.
12 Phennings	make	1 schilling-lub	= 0 1 $\frac{1}{2}$
16 Schilling-lubs		1 mark	= 1 6
2 Marks		1 dollar	= 3 0
3 Marks		1 rixdollar	= 4 6
6 $\frac{1}{2}$ Marks		1 ducat	= 9 4 $\frac{1}{2}$

Books and accounts are kept at the bank, and by most people in the city, in marks, schilling-lubs, and phennings; but some keep them in pounds, schillings, and groots Flemish.

VOL. VII.

EXC

The agio at Hamburgh runs between 20 and 40 Exchange. per cent. All bills are paid in bank-money.

Hamburgh exchanges with Britain by giving an uncertain number of schillings and groots Flemish for the pound Sterling. The groot or penny Flemish here, as also at Antwerp, is worth $\frac{1}{16}$ of a penny Sterling; and so something better than in Holland, where it is only $\frac{1}{16}$ d. Sterling.

6 Phennings	} make	1 groot or penny
6 Schilling-lubs		1 schilling
1 Schilling-lub		2 pence or groots
1 Mark		32 pence or groots
7½ Marks		1 pound.

The par with Hamburgh, and also with Antwerp, is 35s. 6 $\frac{1}{2}$ d. Flemish for 1 l. Sterling.

EXAMPLES. I. How many marks must be received at Hamburgh for 303 l. Sterling, exchange at 35s. 3 d. Flemish per l. Sterling?

L. s. d. L.
If 1 : 35 3 :: 300

12
423
300
32) 126900 (3965 10
96...
309
288
210
192
180
160
(20)
16
320
32
(0)

Decimally.

Flem. s. Marks. Flem. s.
If 20 : 7.5 :: 35.25
4 : 1.5 :: 35.25
1.5

17625
3525

4) 52.875

Marks in 1 l. Sterling 13.21875
300

Marks in 300 l. Sterling 3965.62500
16

3750
625

Schilling-lubs 10.000

G

2. How

EXC

[50]

EXC

Exchange.

2. How much Sterling money will a bill of 3965 mark 10 schilling-lubs amount to, exchange at 35s. 3d. Flemish per pound Sterling?

Fl. s. d. L. St. Mks. sch.

If 35 3 : 1 :: 3965 10

12 32 2

423 7930 20d.

11897

423)126900(300 l. ster.

1269

Decimally.

4 : 1.5 :: 35.25

1.5

17625

2225

4)52.875(13.21875

13.21875)3965.62500(300 l. ster.

3965625

III. Exchange with France.

MONEY-TABLE.

Par in Ster. s. d.

12 Deniers } make { 1 fol = 0 0 1/2

20 Sols } 1 livre = 0 9 1/4

3 Livres } 1 crown = 2 5 1/4

At Paris, Rouen, Lyons, &c. books and accounts are kept in livres, sols, and deniers; and the exchange with Britain is on the crown, or ecu, of 3 livres, or 60 sols Tournois. Britain gives for the crown an uncertain number of pence commonly between 30 and 34, the par, as mentioned above, being 29 1/4 d.

EXAMPLE. I. What sterling money must be paid in London to receive in Paris 1978 crowns 25 sols, exchange at 31 1/4 d. per crown?

Sols. d. Cr. sols.

If 63 : 31 1/4 :: 1978 25

253 60

118705

253

356115

593525

237410

6)0)3003236)5 Rem.

8)500539 3

12)62567 11

2)0)521)3 13

L. 260 13 11 1/4 Anf.

By Practice.

Cr. Sols.

1978 25, at 31 1/4

d.

30 = 1 1/2

1 1/2 = 1 1/2

1 1/2 = 1 1/2

Sols 20 = 1 1/2

5 = 1 1/2

247 5 0

12 7 3

1 0 7 1/2

0 0 10 1/4

0 0 2 1/2

260 13 11 1/4

If you work decimally, say,

Cr. d. Ster. Cr. d. Ster.

As 1 : 31.625 :: 1978.416 : 62567.427083

2. How many French livres will L. 121 : 18 : 6 Sterling amount to, exchange at 32 1/4 d. per crown?

d. Liv. L. s. d.

If 32 1/4 : 3 :: 121 18 6

8 20

263 24 2438

12

29262

24

117048

58524

Liv. sols. den.

263)702288(2670 5 11 Anf.

Rem. (78=5 sols 11 deniers.

IV. Exchange with Portugal.

MONEY-TABLE.

Par. in Ster. s. d. f.

1 ree = 0 0 0.27

1 crusade = 2 3

1 millree = 5 7 1/2

400 rees } make {

1000 rees } make {

In Lisbon, Oporto, &c. books and accounts are generally kept in rees and millrees; and the millrees are distinguished from the rees by a mark set between them thus, 485 $\times$ 372; that is, 485 millrees and 375 rees.

Britain, as well as other nations, exchanges with Portugal on the millree; the par, as in the table, being 67 1/4 Sterling. The course with Britain runs from 63d. to 68d. Sterling per millree.

EXAMPLE. I. How much Sterling money will pay a bill of 827 $\times$ 160 rees, exchange at 63 1/4 d. Sterling per millree?

Rees. d. Rees.

If 1000 : 63 1/4 :: 827.160

8 507

8000 507 579012

413580

Rem.

8000)419370.120 2

12) 52421 — 5d.

20) 4368 — 8s.

L. 218 8 5 1/4 Anf.

By Practice.

Rees.

827.160, at 63 1/4 d.

d.

60 = 1 1/2

3 = 1 1/2

1 1/2 = 1 1/2

1 1/2 = 1 1/2

1 1/2 = 1 1/2

206.790

10.3395

.861625

.4308125

218.4219375

The

EXC

[51]

EXC

Exchange.

The rees being thousandth-parts of the millrees, are annexed to the integer, and the operation proceeds exactly as in decimals.

2. How many rees of Portugal will 500 l. Sterling amount to, exchange at 5s. 4 $\frac{1}{2}$ d. per millree?

d.	Rees.	L.
If 64 $\frac{1}{2}$:	1000 :	500
517	8	20
	8000	10000
		12
		120000
		8000

517)960000000(1856.866 Ans.

V. Exchange with Spain.

MONEY-TABLE.

	Par in Sterl.	s.	d.
35 mervadies	1 rial	=	0 5 $\frac{1}{2}$
8 rials	1 piaftre	=	3 7
375 mervadies	1 ducat	=	4 11 $\frac{1}{2}$

In Madrid, Bilboa, Cadiz, Malaga, Seville, and most of the principal places, books and accounts are kept in piaftres, called also dollars, rials, and mervadies; and they exchange with Britain generally on the piaftre, and sometimes on the ducat. The course runs from 35 d. to 45 d. Sterling for a piaftre or dollar of 8 rials.

EXAMP. I. London imports from Cadiz goods to the value of 2163 piaftres and 4 rials: How much Sterling will this amount to, exchange at 38 $\frac{1}{2}$ d. Sterling per piaftre?

d.	Piaft.	Rials.	d.
	2163	4, at 31 $\frac{1}{2}$ d.	
24 = $\frac{1}{2}$	216	6	
12 = $\frac{1}{4}$	108	3	
2 = $\frac{1}{20}$	18	0 6	
$\frac{2}{8}$ = $\frac{1}{40}$	2	5 0 $\frac{3}{4}$	
$\frac{1}{4}$ = $\frac{1}{80}$	1	2 6 $\frac{3}{8}$	
	345	17 1 $\frac{1}{8}$	
		1 7 $\frac{3}{8}$	

L. 345 18 8 $\frac{1}{6}$ Ans.

2. London remits to Cadiz 345l. 18s. 8 $\frac{1}{6}$ d. How much Spanish money will this amount to, exchange at 38 $\frac{1}{2}$ d. Sterling per piaftre?

d. Piaft. L. s. d.
If 38 $\frac{1}{2}$: 1 :: 345 18 8 $\frac{1}{6}$

307	20
2	6918
	12
614	83024
	16
	498149
	83024

Carr. up 1328389

614(1328389(2163 piaftres.
1228...

1003
614
3898
3684
2149
1842
307
8

Piaft. Rials.
Ans. 2163 4

614)2456(4 rials.
2456

VI. Exchange with Venice.

MONEY TABLE.

5 $\frac{1}{2}$ Soldi } make { 1 gros
24 Gros } make { 1 ducat=50 $\frac{1}{2}$ d Sterling.

The money of Venice is of three sorts, viz. two of bank money, and the picoli money. One of the banks deals in banco money, and the other in banco current. The bank money is 20 per cent. better than the banco current, and the banco current 20 per cent. better than the picoli money. Exchanges are always negotiated by the ducat banco, the par being 4s. 2 $\frac{1}{2}$ d. Sterling, as in the table.

Though the ducat be commonly divided into 24 gros, yet bankers and negotiators, for facility of computation, usually divide it as follows, and keep their books and accounts accordingly.

12 Deniers d'or } make { 1 fol d'or
20 Sols d'or } make { 1 ducat=50 $\frac{1}{2}$ d. Sterling.

The course of exchange is from 45d. to 55d. Sterling per ducat.

EXAMP. I. How much Sterling money is equal to 1459 ducats 18 sols 1 denier, bank money of Venice, exchange at 52 $\frac{3}{4}$ d. Sterling per ducat?

Duc. d. Duc. fol. den.
If 1 : 52 $\frac{3}{4}$:: 1459 18 1

52 $\frac{3}{4}$
2918
7295
75868
$\frac{1}{2}$ = 729 $\frac{1}{2}$
$\frac{1}{4}$ = 364 $\frac{1}{4}$
76962 $\frac{1}{4}$
47 $\frac{1}{8}$

Rem.
12)77010(6d.

2|0)641|7(17s.

L. 320 17 6 Sterling. Ans.

G 2

2. How

Exchange. 2. How many ducats at Venice are equal to 385 l.
12 s. 6d. Sterling, exchange at 4s. 4d. per ducat?

L.	Duc.	L.
If .216 : 1 ::	385.625	
.216)	385.625	
21	385.625	
	Duc.	
195)	347062.5	(1779.8 Ans.
195		
	1520	
	1365	
	1556	
	1365	
	1912	
	1755	
	1575	
	1560	
	(15)	

Bank-money is reduced to current money, by allowing for the *agio*, as was done in exchange with Holland; viz. say, As 100 to 120, or as 10 to 12, or as 5 to 6, so the given bank-money to the current sought. And current money is reduced to bank-money by reversing the operation. And in like manner may *piccoli*-money be reduced to current or to bank money, and the contrary.

100 ducats banco of Venice.
In Leghorn = 73 pezzos | In Lucca = 77 crowns
In Rome = 68½ crowns | In Francfort = 139½ florins.

VII. Exchange with Genoa.

MONEY-TABLE.

12 Denari } make { 1 foldi s. d.
20 Soldi } make { 1 pezzo = 4 6 Sterling.

Books and accounts are generally kept in pezzos, foldi, and denari: but some keep them in lires, foldi, and denari; and 12 such denari make 1 foldi, and 20 foldi make 1 lire.

The pezzo of exchange is equal to 5½ lires; and, consequently, exchange-money is 5½ times better than the lire money. The course of exchange runs from 47 d. to 58 d. Sterling per pezzo.

EXAMP. How much Sterling money is equivalent to 3390 pezzos 16 foldi of Genoa, exchange at 51½ d. Sterling per pezzo?

Soldi.	d.	Pez.	Soldi.
If 20 : 51½ ::	3396	16	
8		20	
	415		
160		67816	
		415	
		339080	
		67816	
		271264	

160)28143640(175897½ = 732 18 1½

If Sterling money be given, it may be reduced or changed into pezzos of Genoa, by reversing the former operation.

Exchange money is reduced to lire-money, by being multiplied by 5½, as follows:

Pez. foldi.	Decimally.
3390 16	3390.8
5½	5.75
16954 0	169540
1695 8	237356
847 14	169540

Lires 19497 2 Lires 19497.100

And lire-money is reduced to exchange-money by dividing it by 5½.

In Milan, 1 crown = 80
In Naples, 1 ducat = 86
In Leghorn, 1 piafre = 20
In Sicily, 1 crown = 127½

VIII. Exchange with Leghorn.

MONEY-TABLE.

12 Denari } make { 1 foldi s. d.
20 Soldi } make { 1 piafre = 4 6 Sterl.

Books and accounts are kept in piafres, foldi, and denari. The piafre here consists of 8 lires, and the lire contains 20 foldi, and the foldi 12 denari, and consequently exchange-money is 6 times better than lire money. The course of exchange is from 47 d. to 58 d. Sterling per piafre.

EXAMPLE. What is the Sterling value of 731 piafres, at 55½ each?

s.	d.	731 piafres, at 55½ d.
4 or 48=	146 4	
6=	18 5 6	
1½=	4 11 4½	

L. 169 0 10½ Ans.

Sterling-money is reduced to money of Leghorn, by reversing the former operation; and exchange-money is reduced to lire-money by multiplying by 6, and lire-money to exchange-money by dividing by 6.

100 piafres of Leghorn are
In Naples = 134 ducats | In Geneva = 185½ crowns
Soldi of Leghorn.

In Sicily, 1 crown = 133½
In Sardinia, 1 dollar = 95½

The above are the chief places in Europe with which Britain exchanges directly; the exchanges with other places are generally made by bills on Hamburg, Holland, or Venice. We shall here, however, subjoin the par of exchange betwixt Britain and most of the other places in Europe with which she has any commercial intercourse.

	Par in Sterling L. s. d.
Rome, 1 crown	= 6 1½
Naples, 1 ducat	= 3 4½
Florence, 1 crown	= 5 4½
Milan, 1 ducat	= 4 7
Bologna, 1 dollar	= 4 3
Sicily, 1 crown	= 5 0
Vienna, 1 rixdollar	= 4 8
Augsburgh, 1 florin	= 3 1½
Francfort, 1 florin	= 3 0
Bremen, 1 rixdollar	= 3 6
Breslau, 1 rixdollar	= 3 3

Berlin,

Exchange.

		Par in Sterling	L. s. d.
Berlin,	1	rixdollar =	4 0
Stetin,	1	mark =	1 6
Embsen,	1	rixdollar =	3 6
Bolsenna,	1	rixdollar =	3 8
Dantzic,	13 $\frac{1}{4}$	florins =	1 0 0
Stockholm,	34 $\frac{1}{2}$	dollars =	1 0 0
Russia,	1	ruble =	4 5
Turkey,	1	asper =	4 6

The following places, viz. Switzerland, Nurem-
burgh, Leipzig, Dresden, Osnaburgh, Brunswic, Co-
logu, Leige, Strasburgh, Cracow, Denmark, Nor-
way, Riga, Revil, Narva, exchange with Britain,
when direct exchange is made, upon the rixdollar, the
par being 4 s. 6 d. Sterling.

IX. Exchange with America and the West Indies.

In North America and the West Indies, accounts as
in Britain, are kept in pounds, shillings, and pence. In
N. America formerly they had few coins circulating a-
mong them, and on that account had been obliged to
substitute a paper-currency for a medium of their com-
merce; which having no intrinsic value, was subjected to
many disadvantages, and generally suffered a great dis-
count. In the West Indies coins are more frequent,
owing to their commercial intercourse with the Spa-
nish settlements.

Exchange betwixt Britain and America, or the West
Indies, may be computed as in the following examples :

1. The neat proceeds of a cargo from Britain to
Boston amount to 845 l. 17 s. 6 d. currency : How
much is that in Sterling money, exchange at 80 per
cent ?

$$\begin{array}{r} \text{If } 180 : 100 \\ 18 : 10 \quad L. \quad s. \quad d. \\ 9 : 5 :: 845 \quad 17 \quad 6 \\ \hline 5 \\ 9)4229 \quad 7 \quad 6 \end{array}$$

L. 469 18 7 $\frac{1}{2}$ Ster. Ans.

2. Boston remits to Britain a bill of 469 l. 18 s.
7 $\frac{1}{2}$ d. Sterling ; How much currency was paid for the
bill at Boston, exchange at 80 per cent ?

$$\begin{array}{r} \text{If } 100 : 180 \quad L. \quad s. \quad d. \\ 5 : 9 :: 469 \quad 18 \quad 7\frac{1}{2} \\ \hline 9 \end{array}$$

$$5)4229 \quad 7 \quad 6$$

845 17 6 currency. Ans.

3. How much Sterling-money will 1780 l. Jamaica
currency amount to, exchange at 40 per cent ?

$$\begin{array}{r} \text{If } 140 : 100 \\ 14 : 10 \quad L. \\ 7 : 5 :: 1780 \\ \hline 5 \end{array}$$

$$7)8900$$

1271 8 6 $\frac{1}{2}$ Ster. Ans.

Bills of exchange from America, the rate being high,
is an expensive way of remitting money to Britain : and
therefore merchants in Britain generally choose to
have the debts due to them remitted home in sugar,
rum, or other produce.

Exchange.

X. Exchange with Ireland.

At Dublin, and all over Ireland, books and accounts
are kept in pounds, shillings, and pence, as in Britain ;
and they exchange on the 100 l. Sterling.

The par of one shilling Sterling is one shilling and
one penny Irish ; and so the par of 100 l. Sterling is
108 l. 6 s. 8 d. Irish. The course of exchange runs
from 6 to 15 per cent.

EXAMP. 1. London remits to Dublin 586 l. 10 s.
Sterling : How much Irish money will that amount to,
exchange at 9 $\frac{1}{2}$ per cent ?

$$\begin{array}{r} L. \\ \text{If } 100 : 109\frac{1}{2} :: 586.5 \\ 8 \quad \quad \quad 877 \end{array}$$

$$800 : 877 \quad 41055$$

$$41055$$

$$46920$$

$$800)514360.5$$

$$642.950625$$

Ans. 642 l. 19 s. Irish.

By practice.

p. cent.	
10 = $\frac{1}{10}$	58.65
2 = $\frac{1}{50}$	11.73 sub.
8 =	46.92
1 = $\frac{1}{100}$	5.865
$\frac{1}{2}$ = $\frac{1}{200}$	2.9325
$\frac{1}{4}$ = $\frac{1}{400}$	.733125

$$9\frac{1}{2} \quad 56.450625 \text{ add.}$$

$$642.950625$$

2. How much Sterling will 625 l. Irish amount to,
exchange at 10 $\frac{1}{2}$ per cent. ?

$$\begin{array}{r} \text{If } 110\frac{1}{2} : 100 :: 625 \\ 8 \quad \quad \quad 800 \end{array}$$

$$\begin{array}{r} L. \quad s. \quad d. \\ 883 \quad 800 \quad 883)500000(566 \quad 5 \quad 0\frac{3}{4} \text{ Ster. Ans.} \end{array}$$

XI. Exchange betwixt London and other places in
Britain.

THE several towns in Britain exchange with Lon-
don for a small premium in favour of London ; such
as, 1, 1 $\frac{1}{4}$, &c. per cent. The premium is more or less,
according to the demand for bills ?

EXAMP. Edinburgh draws on London for 860 l. ex-
change at 1 $\frac{1}{4}$ per cent : How much money must be paid
at Edinburgh for the bill ?

per cent.	
1 = $\frac{1}{100}$	8 12
$\frac{1}{4}$ = $\frac{1}{400}$	2 3
$\frac{1}{2}$ = $\frac{1}{200}$	1 1 6

$$11 \quad 16 \quad 6 \text{ premium.}$$

$$871 \quad 16 \quad 6 \text{ paid for the bill.}$$

To

Exchange. To avoid paying the premium, it is an usual practice to take the bill payable at London a certain number of days after date; and in this way of doing, 73 days is equivalent to 1 per cent

XII. Arbitration of Exchanges.

THE course of exchange betwixt nation and nation naturally rises or falls according as the circumstances and balance of trade happen to vary. Now, to draw upon and remit to foreign places, in this fluctuating state of exchange, in the way that will turn out most profitable, is the design of arbitration. Which is either simple or compound.

I. Simple Arbitration.

In simple arbitration the rates or prices of exchange from one place to other two are given; whereby is found the correspondent price between the said two places, called the *arbitrated price*, or *par of arbitration*; and hence is derived a method of drawing and remitting to the best advantage.

EXAMP. 1. If exchange from London to Amsterdam be 33 s. 9 d. *per* pound Sterling; and if exchange from London to Paris be 32 d. *per* crown; what must be the rate of exchange from Amsterdam to Paris, in order to be put on a par with the other two?

Ster.	Flem.	Ster.
s.	s.	d.
If 20 : 33 9 :: 32		
12	12	
240	405	
	32	
	810	
	1215	

240)12960)54 d. Flem. *per* crown. *Ans.*

2. If exchange from Paris to London be 32d. Sterling *per* crown; and if exchange from Paris to Amsterdam be 54d. Flemish *per* crown; what must be the rate of exchange between London and Amsterdam, in order to be on a par with the other two?

Ster.	Flem.	Ster.
d.	d.	d.
If 32 : 54 :: 240		
240		
216		
108		

—————12) s. d.

32)12960(405 (33 9 Flem. *per* l. Ster. *Ans.*

From these operations it appears, that if any sum of money be remitted, at the rates of exchange mentioned, from any one of the three places to the second, and from the second to the third, again from the third to the first, the sum so remitted will come home entire, without increase or diminution.

From the par of arbitration thus found, and the course of exchange given, is deduced a method of drawing and remitting to advantage, as in the following example.

3. If exchange from London to Paris be 32d. Sterling *per* crown, and to Amsterdam 405 d. Flemish *per* pound Sterling; and if, by advice from Holland to France, the course of exchange between Paris and Amsterdam is fallen to 52 d. Flemish *per* crown; what may be gained *per* cent. by drawing on Paris, and remitting to Amsterdam?

The par of arbitration between Paris and Amsterdam in this case, by Ex. 1. is 54 d. Flemish *per* crown. Work as under.

d. St. Cr.	L. St. Cr.
If 32 : 1 :: 100 : 750 debit at Paris	
Cr. d.Fl	C. d.Fl.
If 1 : 52 :: 750 : 39000 credit at Amsterdam.	
d.Fl. L. St.	d. Fl. L. s. d. Ster.
If 405 : 1 :: 39000 : 96 5 11½ be remitted.	
100	

3 14 0½

But if the course of exchange between Paris and Amsterdam, instead of falling below, rise above the par of arbitration, suppose to 56 d. Flemish *per* crown; in this case, if you propose to gain by the negotiation, you must draw on Amsterdam, and remit to Paris. The computation follows.

L. St. d.Fl.	L. St. d.Fl.
If 1 : 405 :: 100 : 40500 debit at Amsterdam.	
d. Fl. Cr.	d.F. Cr.
If 56 : 1 :: 40500 : 723¾ credit at Paris.	
Cr. d.St.	Cr. L. s. d. Ster.
If 1 : 32 :: 723¾ : 96 8 6⅞ to be remitted.	
100	

3 11 5⅞ gained *per* cent.

In negotiations of this sort, a sum for remittance is afforded out of the sum you receive for the draught; and your credit at the one foreign place pays your debt at the other.

II. Compound Arbitration.

In compound arbitration the rate or price of exchange between three, four, or more places, is given, in order to find how much a remittance passing through them all will amount to at the last place; or to find the arbitrated price, or par of arbitration, between the first place and the last. And this may be done by the following

RULES. I. Distinguish the given rates or prices into antecedents and consequents; place the antecedents in one column, and the consequents in another on the right, fronting one another by way of equation.

II. The first antecedent, and the last consequent to which an antecedent is required, must always be of the same kind.

III. The second antecedent must be of the same kind with the first consequent, and the third antecedent of the same kind with the second consequent, &c.

IV. If to any of the numbers a fraction be annexed, both the antecedent and its consequent must be multiplied into the denominator.

V. To facilitate the operation, terms that happen to be equal or the same in both columns, may be dropped or rejected, and other terms may be abridged.

IV.

Exchange.

VI. Multiply the antecedents continually for a divisor, and the consequents continually for a dividend, and the quot will be the answer or antecedent required.

EXAMP. I. If London remit 1000l. Sterling to Spain, by way of Holland, at 35 s. Flemish per pound Sterling; thence to France, at 58 d. Flemish per crown; thence to Venice, at 100 crowns per 60 ducats; and thence to Spain, at 360 mervadies per ducat; how many piaftres, of 272 mervadies, will the 1000l. Sterling amount to in Spain?

Antecedents.	Consequents.	Abridged.
1l. Sterling	= 35 s. or 420 d. Fl.	1=210
58 d. Flemish	= 1 crown France	29= 1
100 crowns France	= 60 ducats Venice	1= 30
1 ducat Venice	= 360 mervadies Spain	1= 45
272 mervadies	= 1 piaftre	17= 1
How many piaftres	= 1000l. Sterling	= 10

In order to abridge the terms, divide 58 and 420 by 2, and you have the new antecedent 29, and the new consequent 210; reject two ciphers in 100 and 1000; divide 272 and 360 by 8, and you have 34 and 45; divide 34 and 60 by 2, and you have 17 and 30; and the whole will stand abridged as above.

Then, $29 \times 17 = 493$ divisor; and $210 \times 30 \times 45 \times 10 = 2835000$ dividend: and, $493 \overline{) 2835000} (5750 \frac{1}{2}$ piaftres. *Ans.*

Or, the consequents may be connected with the sign of multiplication, and placed over a line by way of numerator; and the antecedents, connected in the same manner, may be placed under the line, by way of denominator; and then abridged as follows:

$$\frac{420 \times 60 \times 360 \times 100}{58 \times 100 \times 272} = \frac{210 \times 60 \times 360 \times 10}{29 \times 1 \times 272}$$

$$\frac{210 \times 60 \times 45 \times 10}{29 \times 34} = \frac{210 \times 30 \times 45 \times 10}{29 \times 17}$$

$$= \frac{2835000}{493}$$

And, $493 \overline{) 2835000} (5750 \frac{1}{2}$ piaftres. *Ans.*

The placing the terms by way of antecedent and consequent, and working as the rules direct, save so many statings of the rule of three, and greatly shortens the operation. The proportion at large for the above question would stand as under.

L. St.	d. Fl.	L. St.	d. Fl.
If 1	: 420 ::	1000	: 420000
d. Fl.	Cr.	d. Fl.	Cr.
If 58	: 1 ::	420000	: 7241 $\frac{1}{2}$
Cr.	Duc.	Cr.	Duc.
If 100	: 63 ::	7241 $\frac{1}{2}$	: 4344 $\frac{4}{5}$
Duc.	Mer.	Duc.	Mer.
If 1	: 360 ::	4344 $\frac{4}{5}$	: 1564137 $\frac{1}{2}$
Mer.	Piaft.	Mer.	Piaft.
If 272	: 1 ::	1564137 $\frac{1}{2}$	: 5750 $\frac{1}{2}$

If we suppose the course of direct exchange to Spain to be 42 $\frac{1}{2}$ d. Sterling per piaftre, the 1000l. remitted would only amount to 5647 $\frac{1}{2}$ piaftres; and, consequently, 103 piaftres are gained by the negociation; that is, about 2 per cent.

2. A banker in Amsterdam remits to London 400 l. Flemish; first to France at 56 d. Flemish per crown; from France to Venice, at 100 crowns per 60 ducats;

from Venice to Hamburgh, at 100d. Flemish per ducat Exchange. from Hamburgh to Lisbon, at 50d. Flemish per crusade of 400 rees; and, lastly, from Lisbon to London at 64d. Sterling per millree: How much Sterling money will the remittance amount to? and how much will be gained or saved, supposing the direct exchange from Holland to London at 36s. 10d. Flemish per pound Sterling?

Antecedents.	Consequents.
56d. Flem.	= 1 crown
100 crowns	= 60 ducats.
1 ducat	= 100 d. Flem.
50 d. Flem.	= 400 rees.
1000 rees	= 64d. Sterling.

How many d. Ster. = 400 l. or 96000 d. Flemish?

This, in the fractional form, will stand as follows.

$$\frac{60 \times 100 \times 400 \times 64 \times 96000}{65 \times 100 \times 50 \times 1000} = \frac{368640}{7}, \text{ and}$$

$7 \overline{) 368640} (52662 \frac{6}{7}$ d. Ster. = 219l. 8s 6 $\frac{6}{7}$ d. St. *Ans.*

To find how much the exchange from Amsterdam directly to London, at 36s. 10d. Flemish per l. Sterling, will amount to, say,

s. d.	d. Fl.	L. St.	d. Fl.	L. s.	d. St.
36	10	If 442	::	96000	: 217 3 10 $\frac{1}{2}$
12				219	8 6 $\frac{1}{2}$

442

Gained or saved, 2 4 8 $\frac{1}{2}$

In the above example, the par of arbitration, or the arbitrated price, between London and Amsterdam, viz. the number of Flemish pence given for 1l. Sterling, may be found thus:

Make 64d. Sterling, the price of the millree, the first antecedent; then all the former consequents will become antecedents, and all the antecedents will become consequents. Place 240, the pence in l. Sterling, as the last consequent, and then proceed as taught above, viz.

Antecedents.	Consequents.
64d. Ster.	= 1000 rees.
400 rees	= 50d. Flem.
100d. Flem.	= 1 ducat.
60 ducats	= 100 crowns.
1 crown	= 56d. Flem.

How many d. Flem. = 240d. Ster.?

$$\frac{1000 \times 50 \times 100 \times 56 \times 240}{64 \times 400 \times 100 \times 60} = \frac{875}{2}, \text{ and}$$

$2 \overline{) 875} (437 \frac{1}{2}$ d. = 36s. 5 $\frac{1}{2}$ d. Flem. per l. Ster. *Ans.*

Or the arbitrated price may be found from the answer to the question, by saying

d. Ster.	d. Flem.	d. St.
If 36 $\frac{10}{12}$	: 96000 ::	240

$$\frac{672000}{240} = 2800$$

$$\frac{2800}{1344} = 2$$

$368640 \overline{) 161280000} (437 \frac{1}{2} = 36 5 \frac{1}{2}$ as before.

The work may be proved by the arbitrated price thus: As 1l. Sterling to 36s. 5 $\frac{1}{2}$ d. Flemish, so 219l. 8s. 6 $\frac{6}{7}$ d. Sterling to 400l. Flemish.

Exchequer. The arbitrated price compared with the direct course shows whether the direct or circular remittance will be most advantageous, and how much. Thus the banker at Amsterdam will think it better exchange to receive 1 l. Sterling for 36s. 5½ d. Flemish, than for 36s. 10 d. Flemish.

EXCHANGE signifies also a place in most considerable trading cities, wherein the merchants, negociants, agents, bankers, brokers, interpreters and other persons concerned in commerce, meet on certain days, and at certain times thereof, to confer and treat together of matters relating to exchanges, remittances, payments, adventures, assurances, freightments, and other mercantile negotiations, both by sea and land.

In Flanders, Holland, and several cities of France, these places are called *burfes*; at Paris and Lyons, *places de change*; and in the Hanse towns, *colleges of merchants*. These assemblies are held with so much exactness, and merchants and negociants are so indispensably required to attend at them, that a person's absence alone makes him be suspected of a failure or bankruptcy. The most considerable exchanges in Europe, are that of Amsterdam; and that of London, called the *Royal Exchange*.

Even in the time of the ancient Romans, there were places for the merchants to meet, in most of the considerable cities of the empire. That said by some to have been built at Rome in the year of the city 259, 493 years before our Saviour, under the consulate of Appius Claudius and Publius Servilius, was called *collegium mercatorum*; whereof it is pretended there are still some remains, called by the modern Romans *loggia*, the lodge; and now usually, the Place of St George. This notion of a Roman exchange is supposed to be founded on the authority of Livy, whose words are as follow; viz. *Certamen consulibus inciderat, uter dedicaret Mercurii ædem. Senates a se rem ad populum rejecit: utri eorum dedicatio jussu populi data esset, eum præesse annonæ mercatorum collegium instituere jussit.* Liv. lib. ii. But it must be here remarked, that *collegium* never signified a building for a society in the purer ages of the Latin tongue; so that *collegium mercatorum instituere* must not be rendered to build an exchange for the merchants, but to incorporate the merchants into a company. As Mercury was the God of traffick, this *ædes Mercuri* seems to have been chiefly designed for the devotions of this company or corporation.

EXCHEQUER, in the British jurisprudence, an ancient court of record, in which all causes concerning the revenues and rights of the crown are heard and determined, and where the crown revenues are received. It took this name from the cloth that covered the table of the court, which was party-coloured, or chequered.

This court is said to have been erected by William the Conqueror, its model being taken from a like court established in Normandy long before that time. Anciently its authority was so great, that it was held in the king's palace, and the acts thereof were not to be examined or controlled in any other of the king's courts; but, at present, it is the last of the four courts at Westminster.

In the exchequer, some reckon seven courts, viz. those of pleas, accounts, receipts, exchequer-chamber (which is an assembly of all the judges on difficult mat-

ters in law), errors in the exchequer, errors in the Exchequer king's bench, and, lastly, the court of equity in the exchequer.

But the exchequer, for the dispatch of business, is generally divided into two parts; one of which is chiefly conversant in the judicial hearing and deciding of all causes relating to the king's coffers, formerly termed the *exchequer of accounts*: the other is called the *receipt of the exchequer*, being principally employed in receiving and paying of money.

Officers of the receipt may take one penny in the pound, as their fees for sums issued out; and they are obliged, without delay, to receive the money brought thither; and the money received is to be put into chests under three different locks and keys, kept by three several officers. All sheriffs, bailiffs, &c. are to account in the exchequer; and in the lower part, termed the receipt, the debtors of the king, and persons in debt to them, the king's tenants, and the officers and ministers of the court, are privileged to sue one another, or any stranger, and to be sued in the like actions as are brought in the courts of king's bench and common-pleas.

The judicial part of the exchequer, is a court both of law and equity. The court of law is held in the office of pleas, according to the course of common law, before the barons: in this court, the plaintiff ought to be a debtor or accomptant to the king; and the leading process is either a writ of subpoena, or quominus, which last goes into Wales, where no process out of courts of law ought to run, except a *capias utlagatum*.

The court of equity is held in the exchequer chamber before the treasurer, chancellor, and barons; but, generally, before the barons only: the lord chief baron being the chief judge to hear and determine all causes. The proceedings in this part of the exchequer are by English bill and answer, according to the practice of the court of chancery; with this difference, that the plaintiff here must set forth, that he is a debtor to the king, whether he be so or not. It is in this court of equity that the clergy exhibit bills for the recovery of their tithes, &c. Here too the attorney-general exhibits bills for any matters concerning the crown; and a bill may be exhibited against the king's attorney by any person aggrieved in any cause prosecuted against him on behalf of the king, to be relieved therein; in which case, the plaintiff is to attend on the attorney-general, with a copy of the bill, and procure him to give in an answer thereto; in the making of which he may call in any person interested in the cause, or any officer, or others, to instruct him, that the king not be prejudiced thereby, and his answer is to be put in without oath.

But, besides the business relating to debtors, farmers, receivers, accountants, &c. all penal punishments, intrusions and forfeitures upon popular actions, are matters likewise cognizable by this court; where there also sits a puisne-baron, who administers the oaths to high sheriffs, bailiffs, auditors, receivers, collectors, comptrollers, surveyors, and searchers of all the customs, &c.

The exchequer in Scotland has the same privileges and jurisdiction as that of England, and all matters competent to the one are likewise competent to the other.

Exchequer, *Black Book of the EXCHEQUER*, is a book under the keeping of the two chamberlains of the exchequer; said to have been composed in 1175 by Gervais of Tilbury, nephew of king Henry II. and divided into several chapters. Herein is contained a description of the court of England, as it then stood, its officers, their ranks, privileges, wages, perquisites, power, and jurisdiction; and the revenues of the crown, both in money, grain, and cattle. Here we find, that for one shilling, as much bread might be bought as would serve 100 men a whole day; that the price of a fat bullock was only 12 shillings, and a sheep four, &c.

Chancellor of the EXCHEQUER. See CHANCELLOR.

EXCHEQUER-Bills. By statute 5 Ann. c. 13. the lord-treasurers may cause exchequer-bills to be made of any sums not exceeding 1,500,000 l. for the use of the war; and the duties upon houses were made chargeable with 4l. 10s. *per cent. per annum* to the bank for circulating them. The bank not paying the bills, actions to be brought against the company, and the money and damages recovered: and if any exchequer-bills be lost, upon affidavit of it before a baron of the exchequer, and certificate from such baron, and security to pay the same if found, duplicates are to be made out: also when bills are defaced, new ones shall be delivered. The king, or his officers in the exchequer, by former statutes, might borrow money upon the credit of bills, payable on demand, with interest after the rate of 3 d. *per diem* for every 100 l. bill. And by 8 & 9 W. 3. c. 20. an interest of 5 d. a-day was allowed for every 100 l. But 12 W. 3. c. 1. lowered the interest on these bills to 4d. a-day *per cent.* And by 12 Ann. c. 11. it is sunk to 2d. a-day.—Forging exchequer bills, or the indorsements thereof, is felony.

EXCISE, (from the Belgic *accūsse*, tributum, "tribute"), an inland duty or imposition, paid sometimes upon the consumption of the commodity, or frequently upon the wholesale, which is the last stage before the consumption. This is doubtless, impartially speaking, the most economical way of taxing the subject, the charges of levying, collecting, and managing the excise-duties, being considerably less in proportion than in other branches of the revenue. It also renders the commodity cheaper to the consumer, than charging it with customs to the same amount would do; for the reason just now given, because generally paid in a much later stage of it. But, at the same time, the rigour and arbitrary proceedings of excise laws seem hardly compatible with the temper of a free nation. For the frauds that might be committed in this branch of the revenue, unless a strict watch is kept, make it necessary, wherever it is established, to give the officers a power of entering and searching the houses of such as deal in exciseable commodities, at any hour of the day, and, in many cases, of the night likewise. And the proceedings, in case of transgressions, are so summary and sudden, that a man may be convicted in two days time in the penalty of many thousand pounds, by two commissioners or justices of the peace; to the total exclusion of the trial by jury, and disregard of the common law. For which reason, tho' lord Clarendon tells us, that to his knowledge the earl of Bedford (who was made lord treasurer by king Charles I. to oblige his parliament) intended to have set up the excise in England, yet it never made a part

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of that unfortunate prince's revenue; being first introduced, on the model of the Dutch prototype, by the parliament itself after its rupture with the crown. Yet such was the opinion of its general unpopularity, that when in 1642 "aspersions were cast by malignant persons upon the house of commons, that they intended to introduce excises, the house for its vindication therein did declare, that these rumours were false and scandalous, and that their authors should be apprehended and brought to condign punishment." Its original establishment was in 1643, and its progress was gradual; being at first laid upon those persons and commodities where it was supposed the hardship would be least perceivable, viz. the makers and venders of beer, ale, cyder, and perry; and the loyalists at Oxford soon followed the example of their brethren at Westminster, by imposing a similar duty: both sides protesting, that it should be continued no longer than to the end of the war, and then be utterly abolished. But the parliament at Westminster soon after imposed it on flesh, wine, tobacco, sugar, and such a multitude of other commodities, that it might be fairly denominated *general*: in pursuance of the plan laid down by Mr. Pymme (who seems to have been the father of the excise) in his letter to Sir John Hotham, signifying, "that they had proceeded in the excise to many particulars, and intended to go on farther; but that it would be necessary to use the people to it by little and little." And afterwards, when the nation had been accustomed to it for a series of years, the succeeding champions of liberty boldly and openly declared "the impost of excise to be the most easy and indifferent levy that could be laid upon the people;" and accordingly continued it during the whole usurpation. Upon king Charles's return, it having then been long established and its produce well known, some part of it was given to the crown, in 12 Car. II. by way of purchase for the feudal tenures and other oppressive parts of the hereditary revenue. But, from its first original to the present time, its very name has been odious to the people. It has, nevertheless, been imposed on abundance of other commodities in the reigns of king William III. and every succeeding prince, to support the enormous expences occasioned by the wars on the continent. Thus brandies and other spirits are now excised at the distillery; printed silks and linens, at the printer's; starch and hair powder, at the maker's; gold and silver wire, at the wiredrawer's; all plate whatsoever, first in the hands of the vender, who pays yearly for a licence to sell it; and afterwards in the hands of the occupier, who also pays an annual duty for having it in his custody; and coaches and other wheel-carriages, for which the occupier is excised; tho' not with the same circumstances of arbitrary strictness with regard to plate and coaches as in the other instances. To these we may add coffee and tea, chocolate and cocoa paste, for which the duty is paid by the retailer; all artificial wines, commonly called *sweets*; paper and pasteboard, first when made, and again if stained or printed; malt, as before-mentioned; vinegars; and the manufacture of glass; for all which the duty is paid by the manufacturer; hops, for which the person that gathers them is answerable; candles and soap, which are paid for at the maker's; malt liquors brewed for sale, which are excised at the brewery; cyder and perry at the vendors;

Excise.

*Blackst.
Comment.*

Excisions der's; leather and skins, at the tanner's; and, lately, tobacco, at the manufacturer's: A list, which no friend to his country would wish to see farther increased.

The excise was formerly farmed out; but is now managed for the king by commissioners in both kingdoms, who receive the whole product of the excise, and pay it into the exchequer. These commissioners are nine in number in England, and five in Scotland. The former have a salary of 1000 l. a year, the latter 600 l. They are obliged by oath to take no fee or reward but from the king himself; and from them there lies an appeal to five other commissioners called *commissioners of appeals*.

EXCISION, in surgery, the cutting out, or cutting off, any part of the body.

EXCISION, in a scripture sense, means the cutting off of a person from his people, by way of punishment for some sin by him committed. The Jews, Selden informs us, reckon up 36 crimes, to which they pretend this punishment is due. The Rabbins reckon three kinds of excision; one, which destroys only the body; another, which destroys the soul only; and a third, which destroys both body and soul. The first kind of excision they pretend is an untimely death; the second is an utter extinction of the soul; and the third, a compound of the two former: thus, making the soul mortal or immortal, says Seldon, according to the degrees of misbehaviour and wickedness of the people.

EXCLAMATION. See ORATORY, n° 85.

EXCLUSION, or *Bill of Exclusion*, a bill proposed about the close of the reign of king Charles II. for excluding the duke of York, the king's brother, from the throne, on account of his being a Papist.

EXCLUSIVE, is sometimes used adjectively, thus; *A patent carries with it an exclusive privilege*. Sometimes adverbially: as, *He sent him all the numbers from n° 145 to n° 247 exclusive*; that is, all between these two numbers, which themselves were excepted.

EXCOECARIA, in botany: A genus of the triandria order, belonging to the dioecia class of plants; and in the natural method ranking under the 38th order, *Tricocceæ*. The male amentum is naked; there is no calyx nor corolla; there are three styles, and a trilocous capsule. There is but one species, the agallocha, or aloes-wood, a native of China and some of the Indian islands, is about the same height and form as the olive tree. Its trunk is of three colours, and contains three sorts of wood: the heart is that of tamberac or calombac, which is dearer in the Indies than even gold itself. It serves to perfume clothes and apartments; and is esteemed a sovereign cordial in fainting fits, a restorative in the palsy, and a cure for ascarides in children. It is burnt as incense in the Chinese and Indian temples; and it is also used to set the most precious jewels that are worked in the Indies.

The aloes-wood is very highly valued; and strange fables were invented as to the origin of the tree that yields it; some pretending that it grew in Paradise, and was only conveyed to us by means of the rivers overflowing their banks and sweeping off the trees in their way; others affirming that it grew on inaccessible mountains, where it was guarded by certain wild beasts, &c. The Siamese ambassadors to the court of France in 1686, who brought a present of this wood from

their emperor, first gave the Europeans any consistent account of it. See *Xrilo-Aloes*.

EXCOMMUNICATION, an ecclesiastical penalty or censure, whereby such persons as are guilty of any notorious crime or offence, are separated from the communion of the church, and deprived of all spiritual advantages.

Excommunication is founded on a natural right which all societies have, of excluding out of their body such as violate the laws thereof; and it was originally instituted for preserving the purity of the church; but ambitious ecclesiastics converted it by degrees into an engine for promoting their own power, and inflicted it on the most frivolous occasions.

The power of excommunication, as well as other acts of ecclesiastical discipline, was lodged in the hands of the clergy, who distinguished it into the *greater* and *lesser*. The lesser excommunication, simply called *aphorismos*, "separation or suspension," consisted in excluding men from the participation of the eucharist, and the prayers of the faithful. But they were not expelled the church; for they had the privilege of being present at the reading of the Scriptures, the sermons, and the prayers of the catechumens and penitents. This excommunication was inflicted for lesser crimes; such as neglecting to attend the service of the church, misbehaviour in it, and the like.

The greater excommunication, called *panteles aphorismos*, "total separation and anathema," consisted in an absolute and entire exclusion from the church and the participation of all its rites. When any person was thus excommunicated, notice was given of it by circular letters to the most eminent churches all over the world, that they might all confirm this act of discipline, by refusing to admit the delinquent to their communion. The consequences of this latter excommunication were very terrible. The excommunicated person was avoided in civil commerce and outward conversation. No one was to receive him into his house, nor eat at the same table with him; and when dead, he was denied the solemn rites of burial.

The Romish pontifical takes notice of three kinds of excommunication. 1. The minor, incurred by those who have any correspondence with an excommunicated person. 2. The major, which falls upon those who disobey the commands of the holy see, or refuse to submit to certain points of discipline; in consequence of which they are excluded from the church militant and triumphant, and delivered over to the devil and his angels. 3. Anathema, which is properly that pronounced by the pope against heretical princes and countries. In former ages, these papal fulminations were most terrible things; but at present, they are formidable to none but a few petty states of Italy.

Excommunication, in the Greek church, cuts off the offender from all communion with the 318 fathers of the first council of Nice, and with the saints; consigns him over to the devil and the traitor Judas; and condemns his body to remain after death as hard as a flint or piece of steel, unless he humbles himself and makes atonement for his sins by a sincere repentance. The form abounds with dreadful imprecations; and the Greeks assert, that if a person dies excommunicated, the devil enters into the lifeless corpse; and therefore, in order to prevent it, the relations of the deceased cut his

Excommu-
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Excommu-
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his body in pieces, and boil them in wine. It is a custom for the patriarch of Jerusalem annually to excommunicate the pope and the church of Rome; on which occasion, together with a great deal of idle ceremony, he drives a nail into the ground with a hammer, as a mark of malediction.

The form of excommunication in the church of England anciently ran thus: "By the authority of God the Father Almighty, the Son and Holy Ghost, and of Mary the blessed mother of God, we excommunicate, anathematize, and sequester from the pale of holy mother church, &c." The causes of excommunication in England are, contempt of the bishop's court, heresy, neglect of public worship and the sacraments, incontinency, adultery, simony, &c. It is described to be two-fold. The less is an ecclesiastical censure, excluding the party from the participation of the sacraments: the greater proceeds farther, and excludes him not only from these, but from the company of all Christians. But if the judge of any spiritual court excommunicates a man for a cause of which he hath not the legal cognizance, the party may have an action against him at common law, and he is also liable to be indicted at the suit of the king.

Heavy as the penalty of excommunication is, considered in a serious light, there are, notwithstanding, many obstinate or profligate men, who would dispise the *brutum fulmen* of mere ecclesiastical censures, especially when pronounced by a petty surrogate in the country, for railing or contumelious words, for non-payment of fees or costs, or other trivial cause. The common law, therefore, compassionately steps in to their aid, and kindly lends a supporting hand to an otherwise tottering authority. Imitating herein the policy of the ancient Britons, among whom, according to Cesar, whoever were interdicted by the druids from their sacrifices, "In numero impiorum ac sceleratorum habentur: ab iis omnes decedunt, aditum eorum sermonemque defugiunt, ne quid ex contagione incommodi accipiant: neque iis potentibus jus redditur, neque honos ullus communicatur." And hence by the common law, an excommunicated person is disabled to do any act that is required to be done by one that is *probus et legalis homo*. He cannot serve upon juries; cannot be a witness in any court; and, which is the worst of all, cannot bring an action, either real or personal, to recover lands or money due to him. Nor is this the whole: for if, within 40 days after the sentence has been published in the church, the offender does not submit and abide by the sentence of the spiritual court, the bishop may certify such contempt to the king in chancery. Upon which there issues out a writ to the sheriff of the county, called from the bishop's certificate a *significavit*; or from its effect, a writ *de excommunicato capiendo*: and the sheriff shall thereupon take the offender and imprison him in the county jail, till he is reconciled to the church, and such reconciliation certified by the bishop; upon which another writ *de excommunicato deliberando*, issues out of chancery to deliver and release him.

EXCOMMUNICATION was also practised among the Jews, who used to expel from their synagogue such as had committed any grievous crime. See the Gospel according to St John, ix. 22. xii. 42. xvi. 2. And Joseph. Antiq. Jud. lib. ix. cap. 22. and lib. xvi. cap. 2.

Godwyn, in his *Moses and Aaron*, distinguishes three degrees, or kinds, of excommunication among the Jews. The first he finds intimated in John ix. 22. The second in 1 Cor. v. 5. And the third in 1 Cor. xvi. 22. See NIDDUI.

The rule of the Benedictines gives the name *excommunication* to the being excluded from the oratory, and the common table of the house, in the inns of court called *discommuning*. This was the punishment of such monks as came too late.

EXCOMMUNICATION, or a being secluded from a participation in the mysteries of religion, was also in use under paganism.

Such as were thus excommunicated were forbidden to assist or attend at the sacrifices, or to enter within the temples; and were afterwards delivered over to the demons and furies of hell, with certain imprecations; which was called among the Romans *diris devovere*. See EXECRATION.

The Druids among the ancient Britons and Gauls, likewise, made use of excommunication against rebels; and interdicted the communion of their mysteries to such as refused to acquiesce in their decisions. See DRUIDS.

EXCORIATION, in medicine and surgery, the galling, or rubbing off of the cuticle, especially of the parts between the thighs and about the anus. In adults, it is occasioned by riding, much walking, or other vehement exercise, and may be cured by vulnerary applications. In children there is often an excoriation, not only of the parts near the pudenda, chiefly of the groin and scrotum, but likewise in the wrinkles of the neck, under the arms, and in other places; proceeding from the acrimony of urine and sweat; and occasioning itching pains, crying, watching, restlessness, &c. To remedy this, the parts affected may be often washed with warm water and sprinkled with drying powders, as chalk, hartshorn, but especially tutty, lapis calaminaris, and cerus, which may be tied loosely in a rag, and the powder shook out on the parts.

EXCREMENT, whatever is discharged out of the body of animals after digestion; or the fibrous part of the aliment, mixed with the bile, saliva, and other fluids. Urine and the feces are the gross excrements that are discharged out of the bladder or belly. Other excrements are the various humours that are secreted from the blood through the different strainers in the body, and which serve for several uses; such as the saliva, sweat, bile, the pancreatic juice, lymph, the semen, nails, the hair, the horns and hoofs of animals.

Alchemists, who have sought every where for their *great work*, as they called it, have particularly operated much on the excrements of men and other animals; but philosophical chemistry has acquired no knowledge from all these alchemical labours, from the obscurity with which their authors have described them. The philosophic chemists have not much examined animal excrements. Of these, Homberg is the only one who has particularly analysed and examined human ordure; and this was done to satisfy an alchemical project of one of his friends, who pretended that from this matter a white oil could be obtained, without smell, and capable of fixing mercury into silver. The oil was found by Homberg, but mercury was not fixed by it.

Excre-
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Excubie.

* See Pu-
trifaction.

The labours of this able chemist were not, however, useless, like those of the alchemists; because he has clearly related the experiments he made on this matter, in the Memoirs of the Academy of Sciences. These experiments are curious, and teach several essential things concerning the nature of excrements. The result of these excrements is as follows: Fresh human feces being distilled to dryness in a water bath, furnish a clear, watery, insipid liquor, of a disagreeable smell, but which contains no volatile alkali; which is a proof that this matter, although nearly in a putrefactive state, is not however putrefied; for all substances really purrid furnish with this degree of heat a manifest volatile alkali*. The dry residuum of the foregoing experiment, being distilled in a retort with a graduated fire, furnishes a volatile alkaline spirit and salt, a scetid oil and leaves a residuous coal. These are the same substances which are obtained from all animal matters.

Human feces, diluted and lixiviated in water, furnish by filtration and evaporation of the water an oily salt of a nitrous nature, which deflagrates like nitre upon ardent coals, and which inflames in close vessels when heated to a certain degree. This same matter yielded to Homberg, who treated it by a complete fermentation or putrefaction, excited by a digestion during 40 days in a gentle water-bath heat, and who afterwards distilled it, an oil without colour, and without bad smell, and such as he endeavoured to find; but which did not, as we said before, fix mercury into silver.

EXCRESCENCE, in surgery, denotes every preternatural tumour which arises from the skin, either in the form of a wart or tubercle. If they are born with a person, as they frequently are, they are called *navi materni*, or marks from the mother; but if the tumour is large, so as to depend from the skin, like a fleshy mass, it is then called a *sarcoma*. See SURGERY.

EXCRETION, or SECRETION, in medicine, a separation of some fluid, mixed with the blood, by means of the glands. Excretions, by which we mean those that evacuate superfluous and heterogeneous humours, purify the mass of blood: the humours which are generated in the blood are excreted by the glands, and are replaced by a sufficient quantity of aliment.

EXCRETORY, in anatomy, a term applied to certain little ducts or vessels, destined for the reception of a fluid, secreted in certain glandules, and other viscera, for the excretion of it in the appropriated places.

EXCUBIÆ, in antiquity, the watches and guards kept in the day by the Roman soldiers. They are contradistinguished from the *vigiliæ* which are kept in the night. The *excubiæ* were placed either at the gates and entrenchments or in the camp; for the latter there was allowed a whole *manipulus* to attend before the *prætorium*, and four soldiers to the tent of every *tribune*. The *excubiæ* at the gates of the camp, and at the entrenchments, were properly called *stationes*. One company of foot and one troop of horse were assigned to each of the four gates every day. To desert their post, or abandon their corps of guards, was an unpardonable crime.

The *triarii*, as the most honourable order of soldiers,

were excused from the ordinary watches; yet being placed opposite to the *equites*, they were obliged to have an eye over them.

LETTERS of EXCULPATION, in Scots law, a writ or summons issued by authority of the court of judicatory, at the instance of a pannel, for citing witnesses to prove his defences, or his objections to any of the jury or witnesses cited against him.

EXCUSATI, in church history, a term used to denote slaves, who flying to any church for sanctuary, were excused and pardoned by their masters; but these were obliged to take an oath to that purpose before they could have them again; and, if they broke the oath, they were punished and fined as persons guilty of perjury.

EXEAT, in church-discipline, a Latin term, used for a permission which a bishop grants a priest to go out of his diocese; or an abbot to a religious to go out of his monastery.

The word is also used in several great schools for leave given a scholar or student to go out. His master has given him an exeat.

EXECRATION, in antiquity, a kind of punishment, consisting of direful curses, and marks of infamy; such was that used against Philip king of Macedon by the Athenians. A general assembly of the people being called, they made a decree, that all the statues and images of that king, and of all his ancestors, should be demolished, and their very name razed; that all the festivals, sacred rites, priests, and whatever else had been instituted in honour of him, should be profaned; that the very places where there had been any monument or inscription to his honour, should be detestable; that nothing should be set up, or dedicated in them, which could be done in clean places; and, lastly, that the priests, as often as they prayed for the Athenian people, allies, armies, and fleets, should as many times detest and execrate Philip, his children, kingdom, land and sea forces and the whole race and name of the Macedonians.

At the taking and demolishing of cities, it was usual amongst the Jews, Greeks, and Romans, to pronounce curses upon, and load with direful execrations, the rebuilders of them.

EXECUTION, in a general sense the act of accomplishing, finishing, or achieving any thing.

EXECUTION, in law, the completing or finishing some act, as of judgment, deed, &c. and it usually signifies the obtaining possession of any thing recovered by judgment of law.

Sir Edward Coke observes, that there are two sorts of executions; the one final; and the other a *quousque*, that tends to an end. An execution final, is that which makes money of the defendant's goods; or extends to his lands, and delivers them to the plaintiff, who accepts the same in satisfaction; and this is the end of the suit, and the whole that the king's writ requires to be done. The writ of execution with a *quousque*, tho' it tends to an end, yet is not final, as in the case of a *capias ad satisfac*, where the defendant's body is to be taken, in order that the plaintiff may be satisfied for his debt. See CAPIAS.

Executions are either in personal, real, or mixed actions. In a personal action, the execution may be made three

Exculpa-
tion
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Execution.

Execution. three ways, viz. by the writ of *capias ad satisfaciendum*, against the body of the defendant; *fieri facias*, against his goods; or *elegit*, against his lands. See *FERI Facias* and *ELEGIT*.

* See *Ha-*
ber. In a real and mixed action, the execution is by writ of *habere facias finem*, and *habere possessionem**. Writs of execution bind the property of goods only from the time of delivery of the writ to the sheriff; but the land is bound from the day of the judgment obtained: and here the sale of any goods for valuable consideration, after a judgment, and before the execution awarded, will be good. It is otherwise as to lands, of which execution may be made, even on a purchase after the judgment, though the defendant sell such land before execution. Likewise, sheriffs may deliver in execution all the lands whereof others shall be seised in trust for him, against whom execution is had on a judgment, &c.

When any judgment is signed, the execution may be taken out immediately thereon; but if it be not issued within a year and a day after, where there is no fault in the defendant, as in the case of an injunction, writ of error, &c. there must be a *scire facias*, to revive the judgment; though, if the plaintiff sues out any writ of execution within the year, he may continue it after the year is expired. After judgment against the defendant, in an action wherein special bail is given, the plaintiff is at liberty to have execution against such defendant, or against his bail: but this is understood where the defendant does not render himself, according to law, in safeguard of the bail; and execution may not be regularly sued forth against a bail, till a default is returned against the principal: also if the plaintiff takes the bail, he shall never take the principal. It is held that an execution may be executed after the death of the defendant; for his executor, being privy thereto, is liable as well as the testator. The executor is an entire thing, so that he who begins must end it: therefore, a new sheriff may distrain an old one, to sell the goods seized on a distringas, and to bring the money into court.

† See *Judge-*
ment. **EXECUTION**, in criminal cases, the completion of human punishment. This follows judgment†; and must in all cases, capital as well as otherwise, be performed by the legal officer, the sheriff or his deputy; whose warrant for so doing was anciently by precept under the hand and seal of the judge, as it is still practised in the court of the lord high steward, upon the execution of a peer: though, in the court of the peers in parliament, it is done by writ from the king. Afterwards it was established, that in case of life, the judge may command execution to be done without any writ. And now the usage is, for the judge to sign the kalendar or list of all the prisoners names, with their separate judgments in the margin, which is left with the sheriff. As, for a capital felony, it is written opposite the prisoner's name, "let him be hanged by the neck; formerly, in the days of Latin and abbreviation, "*sus. per coll.*" for "*suspendatur per collum.*" And this is the only warrant that the sheriff has for so material an act as taking away the life of another. It may certainly afford matter of speculation, that in civil causes there should be such a variety of writs of execution to recover a trifling debt, issued in the king's name, and under the seal of the court, without which the sheriff cannot legally stir one step; and yet that the

execution of a man, the most important and terrible task of any, should depend upon a marginal note. **Execution.**

The sheriff, upon receipt of his warrant, is to do execution within a convenient time; which in the country is also left at large. In London, indeed, a more solemn and becoming exactness is used, both as to the warrant of execution and the time of executing thereof: for the recorder, after reporting to the king in person the case of the several prisoners, and receiving his royal pleasure, that the law must take its course, issues his warrant to the sheriffs, directing them to do execution on the day and at the place assigned. And in the court of king's bench, if the prisoner be tried at the bar, or brought there by *habeas corpus*, a rule is made for his execution; either specifying the time and place, or leaving it to the discretion of the sheriff. And, throughout the kingdom, by statute 25 Geo. II. c. 37. it is enacted that, in case of murder, the judge shall in his sentence direct execution to be performed on the next day but one after sentence passed. But, otherwise, the time and place of execution are by law no part of the judgment. It has been well observed, that it is of great importance that the punishment should follow the crime as early as possible; that the prospect of gratification or advantage, which tempts a man to commit the crime, should instantly awake the attendant idea of punishment. Delay of execution serves only to separate these ideas; and then the execution itself affects the minds of the spectators rather as a terrible sight, than as the necessary consequence of transgression.

The sheriff cannot alter the manner of the execution, by substituting one death for another, without being guilty of felony himself. It is held also by Sir Edward Coke and Sir Matthew Hale, that even the king cannot change the punishment of the law, by altering the hanging or burning into beheading; though, when beheading is part of the sentence, the king may remit the rest. And, notwithstanding some examples to the contrary, Sir Edward Coke stoutly maintains, that *judicandum est legibus, non exemplis*. But others have thought, and more justly, that this prerogative, being founded in mercy, and immemorially exercised by the crown, is part of the common law. For hitherto, in every instance, all these exchanges have been for more merciful kinds of death; and how far this may also fall within the king's power of granting conditional pardons (viz. by remitting a severe kind of death, on condition that the criminal submits to a milder) is a matter that may bear consideration. It is observable, that when Lord Stafford was executed for the popish plot in the reign of King Charles II. the then sheriffs of London, having received the king's writ for beheading him, petitioned the House of Lords, for a command or order from their lordships, how the said judgment should be executed: for, he being prosecuted by impeachment, they entertained a notion (which is said to have been countenanced by Lord Russell), that the king could not pardon any part of the sentence. The lords resolved, that the scruples of the sheriffs were unnecessary; and declared, that the king's writ ought to be obeyed. Disappointed of raising a flame in that assembly, they immediately signified to the House of Commons by one of their members, that they were not satisfied as to the power of the said writ. That house took

Execution took two days to consider of it; and then suddenly resolved, that the house was *content* that the sheriff do execute Lord Stafford by severing his head from his body. It is farther related, that when afterwards the same Lord Ruffel was condemned for high treason upon indictment, the king, while he remitted the ignominious part of the sentence, observed, "that his Lordship would now find he was possessed of that prerogative, which in the case of Lord Stafford he had denied him." One can hardly determine (at this distance from those turbulent times), which most to disapprove of, the indecent and sanguinary zeal of the subject, or the cool and cruel sarcasm of the sovereign.

To conclude: it is clear, that if, upon judgment to be hanged by the neck till he is dead, the criminal be not thoroughly killed, but revives, the sheriff must hang him again. For the former hanging was no execution of the sentence; and, if a false tenderness were to be indulged in such cases, a multitude of collusions might ensue. Nay, even while abjurations were in force, such a criminal, so reviving, was not allowed to take sanctuary and abjure the realm; but his fleeing to sanctuary was held an escape in the officer.

EXECUTION, in the law of Scotland. See **LAW**. Part. III. n^o clxxxv. 52. clxxxvi. 15.

EXECUTION, in the French music, is used to denote the manner of singing, or of the performance of a song. "As to the manner of singing, called in France *execution*, no nation may, with any probability, dispute it with the French. If the French, by their commerce with the Italians, have gained a bolder composition, the Italians have made their advantage of the French, in learning of them a more polite, moving, and exquisite execution." St Evremond.

EXECUTIVE POWER. The supreme executive power of Great Britain is vested by their laws in a single person, the king or queen for the time being. See the article **KING**.

The executive power, in this estate, hath a right to a negative in parliament, *i. e.* to refuse assent to any acts offered; otherwise the other two branches of legislative power would, or might, become despotic.

EXECUTOR, a person nominated by a testator, to take care to see his will and testament executed or performed, and his effects disposed of according to the tenor of the will. See **LAW**.

EXECUTOR, in Scots law, signifies either the person intitled to succeed to the moveable estate of one deceased, or who by law or special appointment is intrusted with the administration of it.

EXECUTORY, in law, where an estate in fee, that is made by deed or fine, is to be executed afterwards by entry, livery, or writ. Leases for years, annuities, conditions, &c. are termed *inheritances executory*.

EXECUTRY, in Scots law, is the moveable estate falling to the executor. Under executry, or moveables, is comprehended every thing that moves itself, or can be moved; such as corns, cattle, furniture, ready money, &c.

EXEDRÆ, in antiquity, denoted halls with many seats, where the philosophers, rhetoricians, and men of learning, met for discourse and disputation. The word occurs in ecclesiastical writers as a general name

for such buildings as were distinct from the main body of the churches, and yet within the limits of the church taken in its largest sense. Among the *exedræ* the chief was the **BAPTISTRY**.

EXEGESIS, a discourse by way of explanation or comment upon any subject. In the Scotch universities, there is an exercise among the students in divinity, called an *exegesis*, in which a question is stated by the respondent, who is then opposed by two or three other students in their turns; during which time the professor moderates, and solves the difficulties which the respondent cannot overcome.

EXEGETES, (formed of *ἐξηγούμεναι* "I explain,") among the Athenians, persons learned in the laws, whom the judges used to consult in capital causes.

EXEGETICA, in algebra, the art of finding, either in numbers or lines, the roots of the equation of a problem, according as the problem is either numerical or geometrical.

EXEMPLAR, a model, or original, to be imitated or copied. See **MODEL**.

EXEMPLAR also denotes the idea, or image, conceived or formed in the mind of the artist, whereby he conducts his work. Such is the idea of Cæsar, which a painter has in his mind when he goes to make a picture of Cæsar.

EXEMPLIFICATION of letters Patent, denotes an exemplar, or copy of letters patent, made from the inrolment thereof, and sealed with the great seal of England. Such exemplifications are as effectual to be showed, or pleaded, as the letters patent themselves.

EXEMPTION, in law, a privilege to be free from some service or appearance: thus, barons and peers of Britain are, on account of their dignity exempted from being sworn upon inquests; and knights, clergymen, and others, from appearing at the sheriff's turn. Persons of 70 years of age, apothecaries, &c. are also by law exempted from serving on juries; and justices of the peace, attorneys, &c. from parish offices.

EXERCISE, among physicians, such an agitation of the body as produces salutary effects in the animal economy.

Exercise may be said to be either active or passive. The active is walking, hunting, dancing, playing at bowls, and the like; as also speaking, and other labour of the body and mind. The passive is riding in a coach, on horseback, or in any other manner. Exercise may be continued to a beginning of weariness, and ought to be used before dinner in a pure light air; for which reason, journeys, and going into the country, contribute greatly to preserve and re-establish health.

Exercise increases the circulation of the blood, attenuates and divides the fluids, and promotes a regular perspiration, as well as a due secretion of all the humours; for it accelerates the animal spirits, and facilitates their distribution into all the fibres of the body, strengthens the parts, creates an appetite, and helps digestion. Whence it arises, that those who accustom themselves to exercise are generally very robust, and seldom subject to diseases.

Boerhaave recommends bodily exercise in diseases of a weak and lax fibre. By riding on horseback, says his commentator, the pendulous viscera of the abdomen are shaken every moment, and gently rubbed as

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Exerci se.

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it were one against another, while in the mean time the pure air acts on the lungs with greater force. But it is to be observed that a weak man should not ride with a full stomach, but either before dinner, or after the digestion is near finished; for when the stomach is distended, weak people do not bear these concussions of the horse without difficulty; but when the primæ viæ are near empty, the remaining feces are discharged by this concussion. Sailing in a ship is also an exercise of great use to weak people. If the vessel moves with an even motion by increasing perspiration it usually excites a wonderful alacrity, creates an appetite, and promotes digestion. These exercises are more especially serviceable to weak people; but, in order to strengthen the body by muscular motion, running, and bodily exercises are to be used. In these we should begin with the most gentle, such as walking, and increase it by degrees till we come to running. Those exercises of the body are more especially serviceable which give delight to the mind at the same time, as tennis, fencing, &c.; for which reason, the wisdom of antiquity appointed rewards for those who excelled in these gymnastic exercises, that by this means the bodies of their youth might be hardened for warlike toils.

As nothing is more conducive to health than moderate exercise, so violent exercise dissipates the spirits, weakens the body, destroys the elasticity of the fibres, and exhausts the fluid parts of the blood. No wonder, then, that acute and mortal fevers often arise from too violent exercise of the body; for the motion of the venous blood towards the heart being quickened by the contraction of the muscles, and the veins being thus depleted, the arteries more easily propel their contained humours through the smallest extremities into the now less resisting veins; and therefore the velocity of the circulation will be increased through all the vessels. But this cannot be performed without applying the humours oftener, or in a greater quantity, to the secretory organs in the same time, whence the more fluid parts of the blood will be dissipated, and what remains will be inspissated; and by the greater action of the vessels upon their contained fluids, and of the reacting fluids upon the vessels, the blood acquires an inflammatory density. Add to this, that by the violent attrition of the solids and fluids, together with the heat thence arising, all the humours will incline to a greater acrimony, and the salts and oils of the blood will become more acrid and volatile. Hence, says Boerhaave, those fevers which arise from too much exercise or motion, are cured by rest of body and mind, with such aliments and medicines as moisten, dilute, and soften or allay acrimony.

The exercise of a soldier in camp, considered as conducive to health, Dr Pringle distinguishes into three heads; the first relating to his duty, the second to his living more commodiously, and the third his diversions. The first, consisting chiefly in the exercise of his arms will be no less the means of preserving health than of making him expert in his duty: and frequent returns of this, early, and before the sun grows hot, will be made more advantageous than repeating it seldom, and staying out long at a time; for a camp affording little convenience for refreshment, all unnecessary fatigue is to be avoided. As to the second article, cutting boughs for shading the tents, making trenches

round them for carrying off the water, airing the straw, cleaning their clothes and accoutrements, and assisting in the business of the mess, ought to be no disagreeable exercise to the men for some part of the day. Lastly, as to diversions, the men must be encouraged to them either by the example of their officers, or by small premiums to those who shall excel in any kind of sports as shall be judged most conducive to health: but herein great caution is necessary, not to allow them to fatigue themselves too much, especially in hot weather or sickly times; but above all, that their clothes be kept dry, wet clothes being the most frequent causes of camp-diseases.

EXERCISE, in military affairs, is the ranging a body of soldiers in form of battle, and making them perform the several motions and military evolutions with different management of their arms, in order to make them expert therein. See also *WORDS of Command*.

EXERCISE, in the British navy, is the preparatory practice of managing the artillery and small arms, in order to make the ship's crew perfectly skilled therein, so as to direct its execution successfully in the time of battle.

The exercise of the great gun was, till lately, very complicated, and abounding with superfluities, in the navies of every nation. The following method was then introduced into the British navy by an officer of distinguished abilities.

- 1st, Silence.
- 2d, Cast loose your guns.
- 3d, Level your guns.
- 4th, Take out your tompions.
- 5th, Run out your guns.
- 6th, Prime.
- 7th, Point your guns.
- 8th, Fire.
- 9th, Sponge your guns.
- 10th, Load with cartridge.
- 11th, Shot your guns.
- 12th, Put in your tompions.
- 13th, Hoose your guns.
- 14th, Secure your guns.

Upon beat-to-arms (every body having immediately repaired to their quarters) the midshipman commanding a number of guns, is to see that they are not without every necessary article, as (at every gun) a sponge, powder-horn, with its priming wires, and a sufficient quantity of powder, crow, hand-spike, bed, quoin, train-tackle, &c, sending without delay for a supply of any thing that may be amissing; and for the greater certainty of not overlooking any deficiency, he is to give strict orders to each captain under him, to make the like examination at his respective gun, and to take care that every requisite is in a serviceable condition, which he is to report accordingly. And (besides the other advantages of this regulation) for the still more certain and speedy account being taken upon these occasions, the midshipman is to give each man his charge at quarters (as expressed in the form of the monthly report), who is to search for his particular implements, and, not finding them, is immediately to acquaint his captain, that, upon his report to the midshipman, they may be replaced.

The man who takes care of the powder is to place himself on the opposite side of the deck from that where

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Exercise. where we engage, except when fighting both sides at once, when he is to be amid-ships. He is not to suffer any other man to take a cartridge from him but he who is appointed to serve the gun with that article, either in time of a real engagement or at exercise.

Lanthorns are not to be brought to quarters in the night, until the midshipman gives his orders for so doing to the person he charges with that article. Every thing being in its place, and not the least lumber in the way of the guns, the exercise begins with,

1. "Silence." At this word every one is to observe a silent attention to the officers.

2. "Cast loose your guns." The muzzle lashing is to be taken off from the guns, and (being coiled up in a small compass) is to be made fast to the eye-bolt above the port. The lashing-tackles at the same time to be cast loose, and middle of the breeching seized to the thimble of the pomillion. The sponge to be taken down, and with the crow, hand-spike, &c. laid upon the deck by the gun. N. B. When prepared for engaging an enemy, the seizing within the clinch of the breeching is to be cut, that the gun may come sufficiently within-board for loading, and that the force of the recoil may be more spent before it acts upon the breeching.

3. "Level your guns." The breech of your metal is to be raised so as to admit the foot of the bed's being placed upon the axle-tree of the carriage, with the quoin upon the bed, both their ends being even one with the other. N. B. When levelled for firing, the bed is to be lashed to the bolt which supports the inner end of it, that it may not be thrown out of its place by the violence of the gun's motion when hot with frequent discharges.

4. "Take out your tompons." The tompon is to be taken out of the gun's mouth, and left hanging by its lanyard.

5. "Run out your guns." With the the tackles hooked to the upper bolts of the carriage, the gun is to be bowfed out as close as possible, without the assistance of crows or hand-spikes; taking care at the same time to keep the breeching clear of the trunks, by hauling it through the rings; it is then to be bent so as to run clear when the gun is fired. When the gun is out, the tackle-falls are to be laid along-side the carriages in neat fakes, that, when the gun by recoiling overhauls them, they may not be subject to get foul, as they would if in a common coil.

6. "Prime." If the cartridge is to be pierced with the priming-wire, and the vent filled with powder, the pan also is to be filled; and the flat space, having a score through it at the end of the pan, is to be covered, and this part of the priming is to be bruised with the round part of the horn. The apron is to be laid over, and the horn hung up out of danger from the flash of the priming.

7. "Point your guns." At this command the gun is, in the first place, to be elevated to the height of the object, by means of the side-sights; and then the person pointing is to direct his fire by the upper sight, having a crow on one side and a hand-spike on the other, to heave the gun by his direction till he catches the object.

N. B. The men who heave the gun for pointing are to stand between the ship's side and their crows or

hand-spikes, to escape the injury they might otherwise receive from their being struck against them, or splintered by a shot; and the man who attends the captain with the match is to bring it at the word, "Point your guns," and kneeling upon one knee opposite the train-truck of the carriage, and at such a distance as to be able to touch the priming, is to turn his head from the gun, and keep blowing gently upon the lighted match to keep it clear from ashes. And as the missing of an enemy in action, by neglect or want of coolness, is most inexcusable, it is particularly recommended to have the people thoroughly instructed in pointing well, and taught to know the ill consequences of not taking proper means to hit their mark; wherefore they should be made to elevate their guns to the utmost nicety, and then to point with the same exactness, having caught the object through the upper sight. At the word,

"Fire." The match is instantly to be put to the bruised part of the priming; and when the gun is discharged, the vent is to be closed, in order to smother any spark of fire that may remain in the chamber of the gun; and the man who sponges is immediately to place himself by the muzzle of the gun in readiness; when, at the next word,

9. "Sponge your gun." The sponge is to be rammed down to the bottom of the chamber, and then twisted round, to extinguish effectually any remains of fire; and, when drawn out, to be struck against the outside of the muzzle, to shake off any sparks or scraps of the cartridge that may have come out with it; and next, its end is to be shifted ready for loading; and while this is doing, the man appointed to provide a cartridge is to go to the box, and by the time the sponge is out of the gun, he is to have it ready; and at the word,

10. "Load with cartridge." The cartridge (with the bottom-end first, seam downwards, and a wad after it) is to be put into the gun, and thrust a little way within the mouth, when the rammer is to be entered: the cartridge is then to be forcibly rammed down; and the captain at the same time is to keep his priming-wire in the vent, and, feeling the cartridge, is to give the word *home*, when the rammer is to be drawn, and not before. While this is doing, the man appointed to provide a shot is to provide one (or two, according to the order at that time) ready at the muzzle, with a wad likewise; and when the rammer is drawn, at the word,

11. "Shot your guns." The shot and wad upon it are to be put into the gun, and thrust a little way down when the rammer is to be entered as before. The shot and wad are to be rammed down to the cartridge, and there have a couple of forcible strokes; when the rammer is to be drawn, and laid out of the way of the guns and tackles, if the exercise or action is continued; but if it is over, the sponge is to be secured in the place it is at all times kept in.

12. "Put in your tompons." The tompons to be put into the muzzle of the cannon.

13. "House your guns." The seizing is to be put on again upon the clinched end of the breeching, leaving it no slacker than to admit of the guns being housed with ease. The quoin is to be taken from under the breech of the gun, and the bed, still resting upon

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upon the bolt, within the carriage, thrust under, till the foot of it falls off the axle-tree, leaving it to rest upon the end which projects out from the foot. The metal is to be let down upon this. The gun is to be placed exactly square; and the muzzle is to be close to the wood, in its proper place for passing the muzzle-lashings.

14. "Secure your guns." The muzzle-lashings must first be made secure, and then with one tackle (having all its parts equally taught with the breeching) the gun is to be lashed. The other tackle is to be bowfed taught, and by itself made fast, that it may be ready to cast off for lashing a second breeching. N. B. Care must be taken to hook the first tackle to the upper bolt of the carriage, that it may not otherwise obstruct the reeving of the second breeching, and to give the greater length to the end part of the fall. No pains must be spared in bowfing the lashing very taught, that the gun may have the least play that is possible, as their being loose may be productive of very dangerous consequences. The quoin, crow, and hand-spike are to be put under the gun, the powder-horn hung up in its place, &c.

Being engaged at any time when there is a large swell, a rough sea, or in squally weather, &c. as the ship may be liable to be suddenly much heeled, the port-tackle fall is to be kept clear, and (whenever the working of the gun will admit of it) the man charged with that office is to keep it in his hand; at the same time the muzzle-lashing is to be kept fast to the ring of the port, and being hauled taught, is to be fastened to the eye-bolt over the port-hole, so as to be out of the gun's way in firing, in order to haul it in at any time of danger.

This precaution is not to be omitted, when engaging to the windward, any more than when to the leeward, those situations being very subject to alter at too short a warning.

A train-tackle is always to be made use of with the lee-guns; and the man stationed to attend it is to be very careful in preventing the guns running out at an improper time.

EXERCISE, may also be applied with propriety to the forming our fleets into orders of sailing, lines of battle, &c. an art which the French have termed *evolutions* or *tactiques*. In this sense exercise may be defined, the execution of the movements which the different orders and dispositions of fleets occasionally require, and which the several ships are directed to perform by means of signals. See TACTICS.

EXERCISES, are also understood of what young gentlemen learn in the academies and riding-schools, such as fencing, drawing, riding the great horse, &c.

How useful, how agreeable soever, study may be to the mind, it is very far from being equally salutary to the body. Every one observes, that the Creator has formed an intimate connection between the body and the mind; a perpetual action and reaction, by which the body instantly feels the disorders of the mind, and the mind those of the body. The delicate springs of our frail machines lose their activity and become enervated, and the vessels are choaked by obstructions when we totally desist from exercise, and the consequences necessarily affect the brain: a more studious and se-

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dentary life is therefore equally prejudicial to the body and the mind. The limbs likewise become stiff; we contract an awkward constrained manner; a certain disgusting air attends all our actions, and we are very near being as disagreeable to ourselves as to others. An inclination to study is highly commendable; but it ought not, however, to inspire us with an aversion to society. The natural lot of man is to live among his fellows: and whatever may be the condition of our birth, or our situation in life, there are a thousand occasions where a man must naturally desire to render himself agreeable; to be active and adroit; to dance with a grace; to command the fiery steed; to defend himself against a brutal enemy; to preserve his life by dexterity; as by leaping, swimming, &c. Many rational causes have therefore given rise to the practice of particular exercises; and the most sagacious and benevolent legislators have instituted, in their academies and universities, proper methods of enabling youth, who devote themselves to study, to become expert also in laudable exercises.

EXERCITOR, in Scots law, he who employs a ship in trade, whether he be owner, or only freights her from the owner.

EXERGESIA. See ORATORY, n° 90.

EXERGUM, among antiquarians, a little space around or without the figures of a medal, left for the inscription, cipher, device, date, &c.

EXETER, the capital city of Devonshire, situated on the river Ex, ten miles north of the British channel: W. Long. 3. 40. N. Lat. 50. 44. Anciently the name of this city was *Isca*, and *Isia Dumnoniorum*. The present name is a contraction of *Excester*, that is, a city upon the Ex. It is large, populous, and wealthy, with gates, walls, and suburbs: the circumference of the whole is about three miles. It is the see of a bishop, transferred hither from Crediton, by Edward the Confessor; and is one of the principal cities in the kingdom for its buildings, wealth, and number of its inhabitants. It had six gates, besides many turrets, several of which are now pulled down. It had formerly so many convents, that it was called *Monk-town*, till king Athelstan changed its name to Exeter, about the year 940; at which time he also fortified the city (which had before been only inclosed with a ditch and a fence of timber) with circular walls, embattlements, towers, and turrets of squared stone, encircling the whole, except the western side, with a deep moat. Besides chapels and 5 large meeting-houses, there are now 15 churches within the walls, and 4 without. St Peter's, the cathedral, is a magnificent pile; though little now remains of the ancient fabric of the church, except that part which is called *Our Lady's Chapel*. It has a ring of 12 bells, reckoned the largest ring of the largest bells in England; as is also its organ, whose largest pipes are 15 inches in diameter. In 1763 the cathedral was repaired, beautified, and new paved; when, in removing the old pavement, was found the leaden coffin of bishop Bitton, who died in 1307; the top of which being decayed, afforded an opportunity of viewing the skeleton lying in its proper form: near the bones of the finger was found a sapphire ring set in gold; the stone considerably large, but of no great value, on account

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Exeter.

Exeter. of several flaws in it. Near this stood a small neat chalice and patten of silver gilt, but the damp had destroyed the greatest part of the gilding. In the centre of the patten was engraved a hand, with the two fore-fingers extended in the attitude of benediction. The top of the crozier was also found, but totally decayed. A most beautiful modern painted glass window has been lately erected at the western end of the cathedral, the eastern end having before a remarkable fine antique one. In the other windows there is much fine ancient painted glass. The altar is remarkable for its beautiful design and execution. On the left-hand side of it there yet exists the seat where Edward the Confessor and his queen sat and installed Leofricus his chancellor, the first bishop of Exeter; and in the south cross aisle is the monument of the same Leofricus, who died 1073, which at the time of his interment was a part of the church-yard, but by the enlarging of the church by his successors became nearly the middle of the building. The grand western end of the church is most magnificently adorned with the statues of the patriarchs, &c. The chapter-house was built in 1439. The beautiful throne for the bishop was constructed about 1466, and is said to be grandest of the kind in Britain. The great north tower was completed in 1485, which contains a bell that weighs 12,500 pounds; and exceeds the great Tom of Lincoln by 2,500 pounds. This city has had divers charters granted, or confirmed, by most of the English kings; but it was made a mayor town in the reign of king John, and a county of itself by king Henry VIII. It is governed by a mayor, 24 aldermen, 4 bailiffs, a recorder, chamberlain, sheriff, town-clerk, &c. They have a sword-bearer, and four stewards, four serjeants at mace wearing gowns, and staff-bearers in liveries with silver badges. It had anciently a mint; and in the reigns of king William III. and queen Anne, many pieces of silver money were coined here, which have the letter E under the bust. Here are 12 or 13 incorporate city-companies. All pleas and civil causes are tried by the mayor, recorder, aldermen, and common-council; but criminal causes, and those relating to the peace, are determined by eight aldermen, who are justices of the peace. Here are four principal streets, all centring in the middle of the city, which is therefore called *Carfax*, from the old Norman word *Quatre voix*, i. e. the four ways. Near it is a conduit, lately removed from the centre to the side of the principal street which was first erected by William Duke, mayor of the city, in the reign of Edward IV. and there are others well supplied with water brought in pipes from the neighbourhood. There is an old castle in the north-east part of the city, called *Rougemont*, from the red soil it stands on; from thence there is a pleasant prospect from the walls. It is supposed to have been built by the West Saxon kings, and that they resided here, as did afterwards the earls and dukes of Cornwall. This castle was remarkably strong both by nature and art. The gate, which originally led into it, was walled up by order of William the Conqueror, in token of his having reduced it to his obedience after a very obstinate resistance; and close by it an inferior gate was made in the wall, in which state they both remain. The outward stone facing is kept in tolerable repair; but in the inside,

being but earth is gradually crumbled down. Here yet remains the ancient chapel, built in 1260, and kept in good repair, where prayers are read and a sermon preached in sessions weeks. The city itself is healthy, and pleasantly situated on the sides of a hill, having other hills to its N. W. and S. by which it is sheltered from the force of storms. The bank which sustained the ditch that in a great part surrounded the castle, is planted and gravelled, and accommodated with seats, it being the place of resort for walking for the inhabitants; and the ditch between it and the castle being filled up, is now thickly planted with elms, which form a delightful grove. The old palace is now entirely demolished, and an elegant sessions-house erected, where the assizes, quarter-sessions, and county-courts are held. In the city and suburbs are prisons both for debtors and malefactors; a work-house, alms-houses, and charity-schools; an hospital for the sick and lame poor of the city and county, upon the model of the infirmaries of London and Westminster; and two free grammar-schools. It has markets on Wednesdays and Fridays; and four fairs in the year. Great trade is carried on here for serges, perpetuanas, long-ells, and other woollen goods, in which it is computed that at least 600,000l. a-year is traded for; yet no markets were erected here for wooll, yarn, and kerseys, till the 30th of Henry VIII. Before that time, the merchants drove a considerable trade to Spain and France: they were incorporated, in the reign of queen Mary I. by the name of the governor, consuls, and society of merchant adventurers, trading to France." Here is also a weekly serge market, the greatest in England, next to the Brigg market at Leeds in Yorkshire: it is said that some weeks as many serges have been sold here as amount to 80,000l. or 100,000l.; for besides the vast quantities of their woollen goods shipped for Portugal, Spain, and Italy, the Dutch give large commissions for buying up serges, perpetuanas, &c. for Holland and Germany. It is particularly remarked of this city, that it is almost as full of gentry as of tradesmen; and that more of its mayors and bailiffs have descended from, or given rise to, good families, than in any other city of its bigness in the kingdom; for the great trade and flourishing state of this city tempted gentlemen to settle their sons in it, contrary to the practice of many of the inland as well as northern counties, where, according to the vain and ruinous notions of the Normans, trade was despised by the gentry as fit only for mechanics and the vulgar. The city was under the jurisdiction of the Romans, whose coins have been frequently dug up in and about it. After they left England, the Saxons drove the Britons out of it into Cornwall, and encompassed it with a ditch, besides bulwarks. The Danes attacked and spoiled it in 875; and afterwards, in revenge of the general massacre of the Danes by the English, Swain, one of their kings, came hither with a great force, put the men to the sword, ravished the women, massacred the children, burnt the city, and defaced the walls. A long time after this, just as it was reviving, William the Conqueror besieged and took it; and it was again besieged in the reign, of king Stephen and Edward IV. In the reigns of Henry VII. it was again besieged by Perkin Warbeck, and battered furiously; but the citizens forced him to raise the siege;

Exeter.

Exeter. siege; which so pleased the king, that he came hither, and presented a cap of maintenance to the city, and gave the very sword from his side to be borne always before the mayor. In the reign of Edward VI. in July 1544, it was smartly cannonaded by the rebels of Cornwall and Devon, who almost starved it by breaking down its bridges, cutting off its water, and stopping up all passages: but it held out till the lord John Russel came with a force and raised the siege on the 6th of August, which was then appointed as an anniversary day of thanksgiving by the city, and is still observed as such. King Charles I.'s queen, to whom this city gave shelter in the civil wars, was here delivered of Henrietta, afterwards duchess of Orleans; whose picture is in its Guild-Hall, as are also General Monk's and George I.'s, &c. In the south-east quarter of the city was a house called *Bedford-house*, wherein the above queen was delivered of the princess. This having lately been taken down, an elegant circus is built on the spot, with a theatre adjoining it; and for the convenience of the inhabitants, a passage has been made through the town-wall to Southern Hay, on which green stands the county hospital, already spoken of, besides a considerable number of new buildings. There are remains of several ancient structures, which are daily giving way to modern erections; among the rest, an old building, said to have been a palace of king Athelstan. The Guildhall is a spacious and convenient building, whose front or portico projects a great way into the street, and was first erected in 1330, to which its present front was rebuilt in 1593, and repaired in 1720. An arm of the sea formerly flowed nearly up to the city's wall, till 1316, when Hugh Courtenay earl of Devon, in revenge for an affront, ruined the navigation, by constructing weirs and dams in the river; but to remedy it, in 1439, an act of parliament passed for making a navigable canal, for the better conveyance of goods in barges to and from the city to Topsham. This was carried into execution in 1581, but not completed till 1675; nor was it after all found sufficient, till the present haven was constructed in 1697, when it was rendered capable of bringing ships of 150 tons quite to the quay, constructed near the walls of the city. In short, Exeter, by a constant adherence to its motto, *Semper fidelis*; has been applauded by all historians for its inviolable fidelity to its sovereigns, whether they held their crown by hereditary or parliamentary right. The city sends two members to parliament; and gives title of earl to the Cecils.—The see of Exeter was once one of the most wealthy in the kingdom; but its revenues were most shamefully wasted by bishop Voysey, who alienated its lands. What little he left was so much encumbered, that the see has never been able to recover its former grandeur; and so small are its present revenues, that it has been found necessary for the bishop to hold some other preferment for the better support of his dignity and rank. This see hath yielded to the nation three lord chancellors, two lord treasurers, one lord president of Wales, and one chancellor to the university of Oxford. The diocese contains the entire counties of Devonshire and Cornwall, wherein are 604 parishes, whereof 239 are impropriate. It hath four archdeacons, viz. of Cornwall, Exeter, Barnstaple, and Totness. The diocese was formerly valued in the king's books at L. 1556 : 14 : 6; but, since bishop Voysey's

time, it is lowered to L. 500, and is computed to be worth annually L. 2700. The clergy's tenth is L. 1200 : 15 : 2½. To the cathedral belong a bishop, a dean, four archdeacons, a chancellor, a treasurer, a chanitor, 24 prebendaries, and other inferior officers and servants.

EXFOLIATION, a term used by surgeons for the scaling of a bone, or its rising and separating into thin laminæ or scales.

EXHALATION, a general term for all effluvia or steams raised from the surface of the earth in form of vapour.

EXHAUSTIONS, in mathematics. Method of exhaustions, is a way of proving the equality of two magnitudes, by a *reductio ad absurdum*; showing, that if one be supposed either greater or less than the other, there will arise a contradiction.

The method of exhaustions was of frequent use among the ancient mathematicians; as, Euclid, Archimedes, &c. It is founded on what Euclid says in his tenth book; viz. that those quantities whose difference is less than any assignable quantity, are equal; for if they were unequal, be the difference never so small, yet it may be so multiplied, as to become greater than either of them; if not so, then it is really nothing. This he assumes in the proof of prop. 1. book x. which imports, that if, from the greater of two quantities, you take more than its half, and from the remainder more than its half, and so continually, there will, at length remain a quantity less than either of those proposed. On this foundation it is demonstrated, that if a regular polygon of infinite sides be inscribed in, or circumscribed about, a circle; the space, which is the difference between the circle and the polygon, will, by degrees, be quite exhausted, and the circle become equal to the polygon.

EXHEREDATION, in the civil law, with us ordinarily called *disinheriting*, is the father's excluding his son from inheriting his estate.

There are 14 causes of exheredation expressed in Justinian's Novel; without some one of which causes, he decrees the exheredation null, and the testament inofficious, as the civilians call it. Indeed, by the ancient Roman law, the father might pronounce exheredation without any cause; but the rigour of this law was restrained and moderated by Justinian.

EXHIBIT, in law, is where a deed, or other writing, being produced in a chancery suit to be proved by witnesses, the examiner, or commissioner appointed for the examination of any such, certifies on the back of the deed or writing, that the same was shown to the witness at the time of his examination, and by him sworn to.

EXHIBITION, in law, a producing, or showing, of titles, authorities, and other proofs, of a matter in contest.

Anciently they used the phrase, *exhibition* of a tragedy, comedy, or the like; but now we say *representation* in lieu thereof.

EXHIBITION, in old writers, is used for an allowance of meat and drink, such as was customary among the religious appropriators of churches, who usually made it to the depending vicar. The benefactions settled for the maintaining of scholars in the universities, not depending on the foundation, are also called *exhibitions*.

Exfoliation
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Exhibition

Exhorta-
tion
I
Exocoetus.

EXHORTATION, in rhetoric, differs only from *suasion*, in that the latter principally endeavours to convince the understanding, and the former to work on the affections.

EXHUMATION, of *ex* "out of," and *humus* "ground)," the act of digging up a body interred in holy ground, by the authority of the judge. In France, the exhumation of a dead body is ordered, upon proof that he was killed in a duel. By the French laws, a parson has a right to demand the exhumation of the body of one of his parishioners, when interred out of the parish without his consent.

EXIGENCE, or **EXIGENCY**, that which a thing requires, or which is expedient and suitable thereto.

EXIGENT, in law, a writ which lies where the defendant in a personal action cannot be found, nor any effects of his within the county, by which he may be attached or distrained.

EXIGENTERS, four officers in the court of common-pleas, who make all exigents and proclamations, in all actions where process of outlawry lies. Writs of superſedeas, as well as the prothonotaries, upon exigents, were likewise drawn up in their office.

EXILE. See **BANISHMENT**.

Among the Romans, the word *exilium* properly signified an interdiction or exclusion from water and fire; the necessary consequence of which was, that the interdicted person must betake himself into some other country, since there was no living without fire and water.—Thus Cicero, *ad Herenn.* observes, that the form of the sentence did not express *exilium*, but only *aquæ & ignis interdictio*. The same author remarks, that exile was not properly a punishment, but a voluntarily flying or avoiding the punishment decreed: *Exilium non esse supplicium, sed perfugium, partusque supplicii*. He adds, that there was no crime among the Romans, as among other nations, punished with exile; but exile was a resource to which people flew voluntarily, in order to avoid chains, ignominy, starving, &c.

The Athenians frequently sent their generals and great men into exile, out of envy to their merits, or distrust of their too great authority. See **OSTRACISM**.

EXISTENCE, that whereby any thing has an actual essence, or is said to *be*. See the article **METAPHYSICS**.

EXIT, properly expresses the departure of a player from off the stage, when he has acted his part. The word is also used in a figurative sense, to express any kind of departure, even death.

EXITERIA, in antiquity, oblations or prayers to any of the Gods for a prosperous expedition or journey. There were also feasts under this denomination, which were celebrated by the Greeks, with sacrifices and prayers, when their generals undertook expeditions against any enemy.

EXOCOETUS, or the **FLYING-FISH**, in ichthyology, a genus belonging to the order of abdominales. The head is scaly, and it has no teeth; it has 10 radii in the branchiostegæ membrane; the body is whitish, and the belly is angular: the pectoral fins, the instruments of flight, are very large. When pursued by any other fish, it raises itself from the water by means of these long fins, and flies in the air to a considerable distance, till the fins dry, and then it falls down into the water. It is a fish that seems to lead a most miserable

life. In its own element, it is perpetually harassed by the dorados and other fish of prey. If it endeavours to avoid them by having recourse to the air, it either meets its fate from the gulls or the albatrosses, or is forced down again into the mouth of the inhabitants of the water, who, below, keep pace with its aerial excursion. This fish is caught in the Mediterranean and some other seas. It is most common between the tropics, and there its enemies are more particularly numerous. In these climates the flying fishes spring out of the water by hundreds, to escape the rapacity of the dolphins, sharks, &c. When flying, they have as formidable enemies to encounter with in that element, viz. the pelican, eagle, diomedea, &c. and frequently throw themselves on board the ships to escape their pursuit. Their flesh is said to be palatable and nourishing food.

EXODIARY, in the ancient Roman tragedy, was the person who, after the drama or play was ended, sung the **EXODIUM**.

EXODIUM, in the ancient Greek drama, one of the four parts or divisions of tragedy, being so much of the piece as included the catastrophe and unravelling of the plot, and answering nearly to our fourth and fifth acts.

EXODIUM, among the Romans, consisted of certain humorous verses rehearsed by the exodiary at the end of the *Fabulæ Atellanæ*.

EXODIUM, in the Septuagint, signifies the end or conclusion of a feast. Particularly it is used for the eighth day of the feast of tabernacles, which it is said had a special view to the commemoration of the *exodus* or departure out of Egypt.

EXODUS, a canonical book of the Old Testament; being the second of the pentateuch, or five books of Moses.

It is so called from the Greek [*exodos*], the "going out" or departure of the children of Israel from the land of Egypt; the history of which is delivered in this book, together with the many miracles wrought on that occasion.

EXOMPHALUS, in surgery, called also *omphalo-cèle*, and *hernia umbilicalis*, is a preternatural tumor of the abdomen, at the navel, from a rupture or distension of the parts which invest that cavity.

EXORCISM, the expelling of devils from persons possessed, by means of conjurations and prayers. The Jews made great pretences to this power. Josephus tells several wonderful tales of the great success of several exorcists. One Eleazer, a Jew, cured many dæmoniacs, he says, by means of a root set in a ring. This root, with the ring, was held under the patient's nose, and the devil was forthwith evacuated. The most part of conjurers of this class were impostors, each pretending to a secret nostrum or charm which was an overmatch for the devil. Our Saviour communicated to his disciples a real power over dæmons, or perhaps over the diseases said to be occasioned by dæmons. See **DÆMONIAC**.

Exorcism makes a considerable part of the superstition of the church of Rome, the rituals of which forbid the exorcising any person without the bishop's leave. The ceremony is performed at the lower end of the church towards the door. The exorcist first signs the possessed person with the sign of the cross, makes him kneel,

Exodiary
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Exorcism.

Exorcists
||
Exotic.

kneel and sprinkles him with holy water. Then follow the litanies, psalms, and prayer; after which the exorcist asks the devil his name, and adjures him by the mysteries of the Christian religion not to afflict the person any more: then, laying his right hand on the dæmoniac's head, he repeats the form of exorcism, which is this: "I exorcise thee, unclean spirit, in the name of Jesus Christ: tremble, O Satan! thou enemy of the faith, thou foe of mankind, who hast brought death into the world; who hast deprived men of life, and hast rebelled against justice; thou seducer of mankind, thou root of evil, thou source of avarice, discord, and envy." The Romanists likewise exorcise houses and other places, supposed to be haunted by unclean spirits; and the ceremony is much the same with that for persons possessed.

EXORCISTS, in church-history, an order of men, in the ancient church, whose employment it was to exorcise or cast out devils. See the preceding article.

EXORDIUM, in oratory, is the preamble or beginning, serving to prepare the audience for the rest of the discourse.

Exordiums are of two kinds; either just and formal, or vehement and abrupt. The last are most suitable on occasions of extraordinary joy, indignation, or the like. See ORATORY, n° 36.

EXOSTOSIS (from *ἐξ* out, and *ὄστος* a bone), in anatomy, an acute eminence or excrescence, pushing preternaturally above the bone.

EXOTERIC and ESOTERIC, are terms denoting *external* and *internal*, and applied to the double doctrine of the ancient philosophers; the one was public or *exoteric*; the other secret or *esoteric*. The first was that which they openly professed and taught to the world; the latter was confined to a small number of chosen disciples. This method was derived originally from the Egyptians; who, according to the united testimony of Herodotus, Diodorus, Siculus, Strabo, Plutarch, &c. had a twofold philosophy, one secret and sacred, another public and common. The same practice also obtained among the Persian Magi, the Druids of the Gauls, and the Brachmans of India. The Egyptian priests, with whom it originated, sustained the character of judges and magistrates, and probably introduced this distinction with a view to the public welfare, and to serve the purposes of legislation and government. Clement of Alexandria informs us, that they communicated their mysteries principally to those who were concerned in the administration of the state; and Plutarch confirms the same declaration. However, others have supposed that they invented the fables of their gods and heroes, and the other external ceremonies of their religion, to disguise and conceal natural and moral truths; but whatever was the motive of their practice, it was certainly applied to political purposes.

EXOTIC, a term properly signifying *foreign* or *extraneous*, i. e. brought from a remote or strange country. In which sense we sometimes say *extotic* or *barbarous terms* or words, &c. The word is derived from the Greek *ἐξω*, *ἐξωθεν* extra, "without, on the outside."

Exotic, is chiefly applied to plants which are natives of foreign countries, particularly those brought from the East and West Indies, and which do not naturally grow in Europe.

The generality of exotics, or exotic plants, do not thrive in England without some peculiar care and culture; they require the warmth of their own climates; whence the use of hot-beds, glass-frames, green houses, &c. See *GREEN-HOUSE* and *STOVE*.

EXPANSION, among metaphysicians, denotes the idea we have of lasting distance, all whose parts exist together.

EXPANSION, in physiology, the enlargement or increase of bulk in bodies, chiefly by means of heat. This is one of the most general effects of that subtile principle, being common to all bodies whatever, whether solid or fluid. In some few cases, indeed, bodies seem to expand as they grow cold, as water in the act of freezing: but this is found to be owing to the extrication of an infinite number of air-bubbles from the fluid at a certain time: and is not at all a regular and gradual expansion like that of metals, or any other solid or fluid substance by means of heat. In certain metals also, an expansion takes place when they pass from a fluid to a solid state; but this too is not to be accounted any proper effect of cold, but of the arrangement of the parts of the metals in a certain manner; and is therefore to be accounted a kind of crystallization rather than any thing else.

The expansion of bodies by heat is very various, and in solids does not seem to be guided by any certain rule. In the 48th volume of the Philosophical Transactions, Mr Smeaton has given a table of the expansions of many different substances, from which the following particulars are extracted. The degree of heat employed was 180 degrees of Fahrenheit's thermometer, and the expansion is expressed in 10,000th parts of an English inch.

A foot of white glass barometer tube	100
Martial regulus of antimony	130
Blistered steel	138
Hard steel	147
Iron	151
Bismuth	167
Hammered copper	204
A mixture of three parts of copper with one of tin	218
Cast brass	225
A mixture of 16 parts of brass with one of tin	229
Brass wire	232
Speculum metal	232
Spelter folder, composed of two parts of brass and one of zinc	247
Fine Pewter	274
Grain tin	298
Soft folder, composed of two parts of lead and one of tin	301
A mixture of eight parts of zinc and one of tin, a little hammered	323
Lead	344
Zinc or spelter	353
Zinc hammered an inch per foot	373

From this table it appears, that no rule can be deduced concerning the degrees of expansion to which bodies are subject by the same degree of heat, either from their specific gravity or otherwise. Zinc, which is much lighter than lead, expands more with heat; but glass, which is lighter than either, expands much less; while

Expansion while copper, which is heavier than a mixture of brass and tin, expands less.

Expectation.

Of all known substances, those of the aerial kind expand most by an equal degree of heat; and in general the greater quantity of latent heat that any substance contains, the more easily it is expanded; though even here we cannot form any general rule. It is certain, however, that the most dense fluids, such as mercury, oil of vitriol, &c. are less expandible than water, spirit of wine, or ether. This last indeed is so easily expanded, that were it not for the pressure of the atmosphere it would be in a continual state of vapour. After bodies are reduced to a vaporous state their expansion seems to go on without any limitation, in proportion to the degree of heat applied; so that it is impossible to say what would be the ultimate effects of that principle upon them in this way. The force with which these vapours expand on the application of high degrees is very great; neither can we say, that any obstacle whatever is insuperable by them. On this principle depend the steam-engines so much used in various mechanical operations; likewise some hydraulic machines; and the instruments called *manometers*, which show the variation of gravity in the external atmosphere, by the expansion or condensation of a small quantity of air confined in a proper vessel. On this principle also perpetual movements might be constructed similar to those invented by Mr Coxe, on the principle of the barometer. A variety of other curious machines may be constructed on the principle of aerial expansion; of which an account is given under the articles **HYDROSTATICS** and **PNEUMATICS**.

The expansion of solid bodies is measured by an instrument named the **PYROMETER**; and the force with which they expand is still greater than that of aerial vapours, the flame of a farthing candle producing an expansion in a bar of iron capable of counteracting a weight of 500 pounds. The quantity of expansion, however, is so small, that it has never been applied to the movement of any mechanical engine. On the principle of the expansion of fluids **THERMOMETERS** are constructed; for an account of which, see that article. For the effects of the different expansions of metals in correcting the errors of machines for measuring time, see the article **PENDULUM**.

EXPECTANCY, **ESTATES IN**, are of two sorts; one created by act of the parties, called a *remainder*; the other, by act of law, called a *reversion*.

EXPECTATION, in the doctrine of chances, is applied to any contingent event, and is capable of being reduced to the rules of computation. Thus a sum of money in expectation, when a particular event happens, has a determinate value before that event happens; so that if a person is to receive any sum, *e. gr.*,

10l. when an event takes place which has an equal probability of happening and failing, the value of the expectation is half that sum or 5 l. and in all cases the expectation of obtaining any sum is estimated by multiplying the value of the sum expected by the fraction which represents the probability of obtaining it. The expectation of a person who has three chances in five of obtaining 100 l. is equal to $\frac{3}{5} \times 100$ or 60 l. and the probability of obtaining 100 l. in this case is equal to $\frac{60}{100} = \frac{3}{5}$.

EXPECTORANTS, in pharmacy, medicines which promote **EXPECTORATION**.

EXPECTORATION, the act of evacuating or bringing up phlegm or other matters out of the trachea, lungs, &c. by coughing, hawking, spitting, &c.

EXPEDITATION, in the English forest-laws, signifies a cutting out the balls of a dog's fore-feet for the preservation of the king's game.

Every one that keeps any great dog not expeditated forfeits three shillings and fourpence to the king. In mastiffs, not the ball of the feet, but the three claws, are to be cut to the skin. *Instit. part iv. p. 308.*

This expeditation was to be performed once in every three years, and was done to every man's dog who lived near the forest, and even the dogs of the foresters themselves.

EXPEDITION, the march of an army to some distant place, with a view of hostilities. Such were the expeditions of Cyrus against Xerxes, and of Bacchus and Alexander into the Indies.

Expeditions for the recovery of the Holy Land were called *croisades*.

EXPERIENCE, a kind of knowledge acquired by long use without any teacher. It consists in the ideas of things we have seen or read, which the judgment has reflected on, to form for itself a rule or method.

Authors make three kinds of experience: The first is the simple uses of the external senses, whereby we perceive the phenomena of natural things without any direct attention thereto, or making any application thereof. The second is, when we premeditatedly and designedly make trials of various things, or observe those done by others, attending closely to all effects and circumstances. The third is that preceded by a foreknowledge, or at least an apprehension of the event, and determines whether the apprehension were true or false; which two latter kinds, especially the third are of great service in philosophy.

EXPERIMENT, in philosophy, is the trial of the result or effect of the applications and motions of certain natural bodies, in order to discover something of their motions and relations, whereby to ascertain some of their phenomena or causes.

Expectorants
|
Experiment.

E X P E R I M E N T A L P H I L O S O P H Y,

IS that which has its foundation in experience, wherein nothing is assumed as a truth but what is founded upon ocular demonstration, or which cannot be denied without violating the common sense and perceptions of all mankind.

In former times philosophers, when reasoning about natural things, instead of following this method, assumed such principles as they imagined sufficient for explaining the phenomena, without considering whether these principles were just or not. Hence for a great

great number of ages no progress was made in science; but systems were heaped upon systems, having neither consistency with one another nor with themselves. No proper explanations indeed were given of any thing; for all these systems, when narrowly examined, were found to consist merely in changes of words, which were often very absurd and barbarous. The first who deviated from this method of philosophising, if we may call it by that name, was Friar Bacon, who lived in the 16th century, and who spent 2000 l. (an immense sum in those days) in making experiments. The admirable Crichton, who flourished about the year 1580, not only disputed against the philosophy of Aristotle, which had for so long been in vogue, but wrote a book against it. Cotemporary with this celebrated personage was Francis Bacon lord chancellor of England, who is looked upon to be the founder of the present mode of philosophising by experiments. But though others might lay the foundation, Sir Isaac Newton is justly allowed to have brought this kind of philosophy to perfection: and to him we are certainly indebted for the greatest part of it. Unfortunately, however, neither Lord Bacon nor Sir Isaac Newton had an opportunity of knowing many important facts relating to the principles of fire and electricity, which have since been brought to light. Hence all their philosophy was merely mechanical, or derived from the visible operations of solid bodies, or of the grosser fluids upon one another. In such cases, therefore, where the more subtle and active fluids were concerned, they fell into mistakes, or were obliged to deny the existence of the principles altogether, and to make use of terms which were equally unintelligible and incapable of conveying any information with those of their predecessors. A remarkable instance of the errors into which they were thus betrayed, we have in the doctrine of projectiles, where the most enormous deviations from truth were sanctified by the greatest names of the last century, merely by reasoning from the resistance of the air to bodies moving slowly and visibly, to its resistance to the same bodies when moved, with high degrees of velocity*. In other cases they were reduced to make use of words to express immaterial powers, as attraction, repulsion, rarefaction, &c. which have since tended in no small degree to embarrass and confound science by the disputes that have taken place concerning them. The foundations of the present system of experimental philosophy are as follow.

I. All the material substances of which the universe is composed are called *natural bodies*. What we perceive uniform and invariable in these substances we call their *properties*. Some of these are general and common to all matter, as extension; others are proper to particular substances, for instance fluidity; while some appear to be compounded of the general and particular properties, and thus belong to a still smaller number; as the properties of air, which are derived from the general property of extension combined with those of fluidity, elasticity, &c.

II. In taking a particular review of the properties of bodies, we naturally begin with that of *extension*. This manifests itself by the three dimensions of length, breadth, and thickness. Hence proceeds the divisibility of matter; which the present system supposes to reach even to infinity: but though this proposition be

supported by mathematical demonstrations, it is impossible we can either have any distinct idea of it, or of the opposite doctrine, which teaches that matter is composed of excessively minute particles called *atoms*, which cannot be divided into smaller ones. The subtilty indeed to which solid bodies may be reduced by mechanical means is very surprising; and in some cases is so great, that we might be tempted to suppose that a farther division is impossible. Thus, in grinding a speculum, the inequalities of its surface are so effectually worn off, that the whole becomes in a certain degree invisible, showing not itself by the light which falls upon it, but the image of other bodies; but the smallest scratch which disturbs the equality of the surface is at once distinctly visible.

III. From the arrangement of these ultimate particles of matter, whatever we suppose them to be, arise the various figures of bodies; and hence figure is a property of all bodies no less universal than extension, unless we choose to speak of the ultimate particles of matter, which, as they are supposed to be destitute of parts, must consequently be equally destitute of figure; and the same consequence will follow whether we adopt this supposition or the other. The figures of bodies are so extremely various and dissimilar, that it is impossible to find any two perfectly alike. It is indeed the next thing to impossible to find two in which the dissimilarity may not be perceived by the naked eye; but if any such should be found, the microscope will quickly discover the imbecility of our senses in this respect. Solidity is another property essential to all matter. By this we mean that property which one quantity of matter has of excluding any other from the space which itself occupies at that time. Hence arises what we call *resistance*, which is always an indication of solidity; and no less so in those bodies which we call *fluid* than in those which are the most solid. This may at first seem to be a contradiction; but fluids yield only when they can get away from the pressure; in all other cases they resist as violently as the most solid bodies. Thus water confined in a tube will as effectually resist the impression of a piston thrust down upon it as though it were the most solid substance. Air indeed will yield for a certain time; but this, as appears from several experiments, is entirely owing to a more subtle fluid, viz. that of elementary fire being pressed out from among its particles. As long as this fluid can be forced out, either from among the particles of air, water, or any other more gross fluid substance, the latter will be found compressible, as a heap of wet sand would be by squeezing the water out from it: but when we come to the most subtle of all elements, such as we suppose that of fire to be, there cannot be any possibility of compressing it, even though we had a vessel so close as to prevent it from escaping through its sides; because its parts are already as near each other as they can be.

IV. The distance of the parts of bodies from each other is what we call their porosity, and was formerly supposed to be owing to a vacuum interspersed between them; but now it is generally allowed that the pores of solid bodies as well as of fluids are filled with an extremely subtle matter which pervades all nature. The porosity of bodies with regard to one another may be thus explained. Wood, or a sponge, is porous with regard

* See Gun-
nery.

regard to water ; but water itself is porous with regard to air, which it absorbs in considerable quantity. Both air and water are porous with regard to the element of fire, which produces very considerable changes upon them, according to the quantity of it they contain, or the manner it acts in their pores. This element itself, however, is not porous with regard to any other substance. Its pores, therefore, if it has any, must be absolute vacuities destitute of any matter whatever. Vacuities of this kind indeed are supposed to be absolutely necessary to motion : for though we may say, matter being divisible almost *ad infinitum*, that a body or substance more solid may move in another substance that is more subtle, and that will give way to its motion, we must nevertheless have recourse to a last resort, and admit of an ultimate vacuum, which will give room sufficient to the least corpuscle, that its part *A* may take the place of its part *B* without the least resistance : besides, it is not to be imagined, that nature, in fact, admits of that infinite divisibility which our imagination can conceive, and that every thing which is possible in idea, is at all times practicable. All that exists is possible, but all that is possible does not however exist. By density, is understood the proportion between the extension and solidity of a body : one body therefore is more dense than another, when, under the same degree of extension, it contains more solid matter : and this quality arises from condensation and compression. Elasticity is nothing more than that effort by which certain bodies, when compressed, endeavour to restore themselves to their former state ; and this property supposes them compressible. As all these natural properties of bodies are of great utility in explaining the principles of physics and in applying them to all the arts, experimental philosophy proves their reality by a thousand examples.

V. We discover still other properties in bodies : such as mobility, which we must not here confound with motion. This mobility arises from certain dispositions which are not in an equal degree in all bodies : from whence it comes that some are more easily moved than others : and this proceeds from the resistance to motion which is perceived in all bodies, having regard merely to their masses ; and this resistance is called *vis inertia*, or *inert force*. A body is said to be in motion when it is actually moving from one place to another ; or, whenever a body changes its situation with regard to the objects that surround it, either nearly or remotely, it is said to be in motion. There are three principal matters to be considered in a moving body ; its direction, its velocity, and the quantity of its motion : and here physics explains the force or moving power ; it likewise distinguishes between simple and compound motion. Simple motion is that which arises from only one force, or which tends to only one point. It describes the laws, and explains the resistance, of mediums ; the resistance of friction ; the difficulties of a perpetual motion ; the alteration of direction occasioned by the opposition of a fluid matter ; reflected or reverberated motion ; the communication of motion by the shock of bodies, &c. Compound motion is that of a body impelled to move by several causes or powers which act according to their different directions. Physics here likewise investigates the laws of motion ; and is particularly applied to the explaining, under this

head, what are called the *central forces*, which produce a motion that is either circular or in a curve line, and which incessantly urge the moving body either to approach or recede from the centre. To distinguish these from each other, the former is called the *centripetal force*, and the latter the *centrifugal force*.

VI. By gravity, or ponderosity, is to be understood that force which occasions bodies to pass from a higher to a lower place, when nothing opposes their course, or when the obstacles are not sufficient to stop them. Speculative philosophy investigates its cause, and perhaps in vain. Experimental philosophy contents itself with describing the phenomena, and teaching the laws of gravity, which are thoroughly established by a thousand reiterated experiments. In order properly to understand this subject, we must take care not to confound the term *gravity* with that of *weight*. By the former, we understand that force which urges bodies to descend through a certain space in a given time. By the latter, is meant the quantity of a heavy body that is contained under the same bulk. The phenomena are explained by the experiments themselves, and by inferences deduced from them.

VII. Hydrostatics is a science of which the object is the gravity and equilibrium of fluids in particular. Though the gravity of these bodies is the same with that of others, and is subject to the same laws, yet their state of fluidity gives rise to particular phenomena, which it is of consequence to know. But as hydrostatics cannot be successfully treated on without the assistance of calculation, it has been ranked among the mathematical sciences.

VIII. We say the same with regard to mechanics ; which is the art of employing, by the aid of machines, the motion of bodies, in conformity to its properties and laws, as well with regard to solids as fluids, either more commodiously or more advantageously.

IX. After it has made the most accurate experiments, and the most judicious observations, on all these different subjects, and the properties of bodies in particular. Experimental Philosophy passes to the examination of the air, the water, fire, the wind, colours, &c. The air is a fluid with which we are surrounded from the instant of our birth, and without which we cannot exist. It is by the properties and the influences of the air, that nature gives increase and perfection to all that it produces for our wants and conveniences ; it is the spirit of navigation : sound, voice, speech itself, are nothing more than percussions of the air : this globe that we inhabit is completely surrounded by air ; and this kind of coverture, which is commonly called the *atmosphere*, has such remarkable functions, that it evidently appears to concur to the mechanism of nature. Experimental physics, therefore, considers the air, 1. Of itself, independent of its bulk ; and the figure of its whole body : it examines its essential properties ; as its gravity, density, spring, &c. The air-pump is here of indispensable use ; and by this machine physics examines in what manner space, or a vacuum, is made. It likewise shows the necessity of air to the preservation of animal-life ; the effect it has on sound, fire, and gunpowder, *in vacuo* ; and a hundred other experiments of various degrees of curiosity. 2. It considers the air as the terrestrial atmosphere, sometimes as a fluid at rest, and sometimes as in motion. And

And by these means it accounts for the variation of the mercury in the barometer, and why it sinks in proportion as the height of the atmosphere diminishes; as also for the figure, the extent, and weight of the atmosphere: it shows the method of determining the height of mountains, the nature of sound in general, of its propagation, and of sonorous bodies. The late discoveries of Dr Priestley and others have added a new and a very considerable branch to experimental philosophy in this respect, of which an account is given under the article AEROLOGY.

X. It is here also that experimental philosophy considers the nature of the wind; which is nothing more than agitated air, a portion of the atmosphere that moves like a current, with a certain velocity and determinate direction. This fluid, with regard to its direction, takes different names according to the different points of the horizon from whence it comes, as east, west, north, and south. Winds are likewise distinguished into three sorts; one of which is called *general* or *constant*, as the trade-winds which continually blow between the tropics; another is the *periodical*, which always begin and end within a certain time of the year, or a certain hour of the day, as the monsoons, the land-breezes and sea-breezes, which arise constantly in the morning and evening; and lastly, such as are *variable*, as well with regard to their direction as their velocity and duration.

M. Mariotte computes the velocity of the most impetuous wind to be at the rate of 32 feet in a second, and Mr Derham makes it 66 feet in the same time. The first, doubtless, meant the wind of the greatest velocity that had come to his knowledge. The invention of aerostatic machines has tended more to show the real velocity of the wind than any other invention as yet made public: but all of them move slower than the aerial current; so that the real velocity of the wind remains yet undetermined.

XI. The force of the wind, like that of other bodies, depends on its velocity and mass; that is, the quantity of air which is in motion: so the same wind has more or less force on any obstacle that opposes it, in proportion as that obstacle presents a greater or a less surface: for which reason it is that they spread the sails of a vessel more or less, and place the wings of a wind-mill in different directions. The machines by which the winds are measured, are called *anemometers*. They show the direction, the velocity, and the duration of winds. It is by the agitations of the wind that the air is purified; that the seeds of trees and herbs are conveyed through the forests and fields; that ships are driven from one pole to the other; that our mills turn upon their axes, &c.; and art, by imitating nature, sometimes procures us artificial winds, by which we refresh our bodies, invigorate our fires, purify our corn, &c.

XII. Water is an universal agent, which nature employs in all her productions. It may be considered as in three states, 1. As a liquid; 2. As a vapour; 3. As ice. These three different states do not in any manner change its essence, but make it proper to answer different ends. The natural state of water would be that of a solid body, as fat, wax, and all those other bodies which are only fluid when heated to a certain degree: for water would be constantly ice, if the particles of fire, by which it is penetrated in the temper-

ate climates, did not render it fluid, by producing a reciprocal motion among its parts; and, in a country where the cold is continually strong enough to maintain the congelation, the assistance of art is necessary to make it fluid in the same manner as we do lead, &c. Water, when not in ice, is a fluid that is insipid, transparent without colour, and without smell, and that easily adheres to the surface of some bodies, that penetrates many, and extinguishes fire. Experimental philosophy investigates the origin of fountains; the cause of the saltiness of the sea; the means of purifying water; what is its weight, and what are its effects when heated, &c. It likewise examines this fluid in the state of vapour; and finds that a drop of water, when in vapour, occupies a space vastly greater than it did before. It explains the *æolipile* and its effects; fire-engines; and the force of vapours that give motion to immense machines in mines and elsewhere, &c. and lastly, it considers water in the state of ice. Ice consequently is more cold than water; and its coldness increases if it continue to lose that matter, already too rare, or too little active to render it fluid. Experimental physics endeavours to investigate the causes of the congelation of water, and why ice is lighter than water; from whence it derives that expansive force by which it breaks the containing vessel; the difference there is between the congelation of rivers and that of standing waters; why ice becomes more cold by the mixture of salts; and many other similar phenomena.

XIII. The nature of fire is yet very much unknown to the most learned philosophers. As objects when at a great distance are not perceptible to our senses, so when we examine them too nearly, we discern them but confusedly. It is still disputed whether fire be a homogeneous, unalterable matter, designed by its presence, or by its action to produce heat, inflammation, and dissolution, in bodies; or if its essence consists in motion only, or in the fermentation of those particles which we call *inflammable*, and which enter as principles, in greater or less quantities, in the composition of mixed bodies. The most learned inquirers into nature incline to the former opinion; and have recourse to a matter which they regard as the principle of fire. They suppose that there is in nature a fluid adapted to this purpose, created such from the beginning, and that nothing more is necessary than to put it in action. The numberless experiments which are daily made in electricity seem to favour this opinion, and to prove that this matter, this fluid, this elementary fire, is diffused through all nature, and in all bodies, even ice itself. We cannot say to what important knowledge this great discovery of electricity may lead if we continue our inquiries concerning it. It appears, however, that we may believe, without any inconvenience or absurdity, that fire and light, considered in their first principle, are one and the same substance differently modified.

XIV. Be this matter, however, as it may, experimental philosophy is employed in making the most ingenious and most useful researches concerning the nature of fire, its propagation, and the means by which its power may be excited or augmented; concerning the phosphorus and its inflammation; fire excited by the reflection of the sun's rays from a mirror; and on the effects of fire in general; concerning lightning and its effects; the fusion of metals; gunpowder and its explosion;

explosion; flame and the aliments of fire; and an infinity of like objects which it explains, or concerning which it makes new discoveries, by the aid of experiments.

XV. By the word *light*, we understand that agent by which nature affects the eye with that lively and almost constantly pleasing sensation, which we call *seeing*, and by which we discern the size, figure, colour, and situation of objects, when at a convenient distance. All philosophers agree, that the light, which is diffused in any place, is a real body. But what this body is, and by what means it enters that place where it is perceived, is a question about which philosophers are divided.

XVI. Experimental philosophy is applied in discovering or proving, by an infinity of experiments, what is the nature of light, in what manner it is propagated, what its velocity and progressive motion. It also investigates and explains the principles of *optics* properly so called, and shows the directions which light observes in its motion. From thence it proceeds to the examen of the principles of *catoptrics*, and describes the laws and effects of reflected light. It next treats of the principles of *dioptrics*, and explains the laws of refracted light; and lastly, it teaches, from the principles of natural and artificial vision, the constructing of optical instruments, as lenses, concave mirrors, prisms, telescopes, &c. &c. and the uses to which they are applied.

XVII. By resolving or separating the rays of light, philosophy has obtained true and clear discoveries of the nature of colours. We are naturally led to imagine that colours, and their different degrees, make a part of the bodies that present them to our sight; that white is

inherent in snow, green in leaves and grass, and red in a stuff dyed of that colour. But this is far from being true. If an object, which presents any colour to our sight, be not illuminated, it presents no colour whatsoever. In the night all is black. Colours therefore depend on light; for without that we could form no idea of them; but they depend also on bodies; for of several objects presented to the same light, some appear white, others red, blue, &c. But all these matters being separate from our own bodies, we should never acquire any ideas of them, if the light, transmitted or reflected by these objects, did not make them sensible to us, by striking upon the organs of our sight, and if these impressions did not revive in us those ideas which we have been used to express by certain terms. For these reasons philosophy considers colours from three points of view, 1. As in the light; 2. In bodies, as being coloured; and, 3. From the relation they have to our visual faculties, which they particularly affect, and by which we are enabled to distinguish them.

It is unnecessary in this place to say more either on colour in particular or experimental philosophy in general. The different subjects of this collective article are particularly treated under their proper names, in the order of the alphabet: the reader will therefore turn, as he has occasion, to ACOUSTICS, CATOPTICS, CHROMATICS, DIOPTRICS, HYDROSTATICS, MECHANICS, OPTICS, PNEUMATICS, ELECTRICITY, MAGNETISM, &c. &c. &c. Also AEROLOGY, AEROSTATION, ATMOSPHERE, *BURNING-glass*, COLD, COLOUR, CONGELATION, EVAPORATION, FIRE, FLAME, FLUIDITY, HEAT, IGNITION, LIGHT, SOUND, STEAM, WATER, WIND, &c.

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Experi-
mentum
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Expiation.

EXPERIMENTUM CRUCIS, a capital, leading, or decisive experiment; thus termed, either on account of its being like a cross, or direction-post placed in the meeting of several roads, guiding men to the true knowledge of the nature of that thing they are enquiring after; or, on account of its being a kind of torture, whereby the nature of the thing is at were extorted by force.

EXPHORESIS. See ORATORY, n° 85.

EXPIATION, a religious act, by which satisfaction or atonement is made for the commission of some crime, the guilt done away, and the obligation to punishment cancelled.

Expiations among the Heathens, were of several kinds; as sacrifices and religious washings. They were used for effacing a crime, averting any calamity, and on numberless other occasions, as purifying towns, temples, and sacred places, and armies before and after battle. And they were performed for whole cities as well as particular persons.

The method of expiation among the Jews was chiefly by sacrifice, whether for sins of ignorance, or to purify themselves from certain pollutions.

Fest of EXPIATION among the Jews, called by our translators the *day of atonement*, was held on the tenth day of Tisri, or the seventh month of the Jewish year, answering to part of our September and October. It

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was instituted by God himself, Levit. xxiii. 27, &c. On that day the high-priest, the figure or type of Jesus Christ, entered into the most holy place, and confessed his sins; and, after several ceremonies, made an atonement for all the people to wash them from their sins. Lev. chap. xvi. See *SCAPE-Goat*.

EXPIATION, in a signrative sense, is applied by divines to the pardon procured to the sins of the penitent by the merit of Christ's death. See the article CHRISTIANITY.

EXPIRATION, in medicine. See EXSPIRATION.

EXPIRATION, is also used figuratively, for the end of a term of time granted, agreed on, adjudged.

EXPLICIT, in the schools, something clear, distinct, formal, and unfolded.

EXPLOSION, in natural philosophy, a sudden and violent expansion of an aerial or other elastic fluid, by which it instantly throws off any obstacle that happens to be in the way, sometimes with incredible force, and in such a manner as to produce the most astonishing effects upon the neighbouring objects.

Explosion differs from expansion, in that the latter is a gradual and continued power, acting uniformly for some time; whereas the former is always sudden, and only of momentary duration. The expansions of solid substances do not terminate in violent explosions, on account of their slowness, and the small space through which

Expiation
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Explosion.

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Difference
between
explosion
and expansion.

Explosion. which the metal, or other expanding substance, moves; though their strength may be equally great with that of the most active aerial fluids. Thus we find, that though wedges of wood, when wetted, will cleave solid blocks of stone, they never throw them to any distance, as is the case with gun-powder. On the other hand, it is seldom that the expansion of any elastic fluid bursts a solid substance without throwing the fragments of it to a considerable distance, the effects of which are often very terrible. The reasons of this may be comprised in the two following particulars: 1. The immense velocity with which the aerial fluids expand, when affected by a considerable degree of heat; and, 2. Their celerity in acquiring heat and being affected by it, which is much superior to that of solid substances. Thus air, heated as much as iron when brought to a white heat, is expanded to four times its bulk; but the metal itself will not be expanded the 500th part of the space. In the case of gun-powder, which is a violent and well-known explosive substance, the velocity with which the flame moves is calculated by Mr Robins, in his Treatise upon Gunnery, to be no less than 7000 feet in a second, or little less than 79 miles per minute. Hence the impulse of the fluid is inconceivably great, and the obstacles on which it strikes are hurried off with a vast velocity, though much less than that just mentioned; for a cannon bullet, with the greatest charge of powder that can be conveniently given, does not move at a greater rate than 2400 feet per second, or little more than 27 miles per minute. The velocity of the bullet again is promoted by the sudden propagation of the heat through the whole body of air as soon as it is extricated from the materials of which the gunpowder is made; so that it is enabled to strike all at once, and thus greatly to augment the momentum of the ball. It is evident that this contributes very much to the force of the explosion by what happens when powder is wetted or mixed with any substance, which prevents it from taking fire all at once. In this case the force of the explosion, even when the same quantity of powder is made use of, cannot be compared to that of dry powder.

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Electric ex-
plosions the
strongest of
all.

Upon these principles we may conclude, that the force of an explosion depends. 1. On the quantity of elastic fluid to be expanded; 2. On the velocity it acquires by a certain degree of heat; and, 3. On the celerity with which the degree of heat affects the whole of the expansile fluid. These three take place in the greatest perfection where the electric fluid is concerned; as in cases of lightning, earthquakes, and volcanoes. This fluid, as is shown in many parts of this work, differs not from elementary fire or the light of the sun; it pervades the whole system of nature; its expansion is nothing else than its motion from a centre towards a circumference, for it does not seem capable of any proper expansion by a separation of its parts like any other fluid. Hence, when it begins to expand in this manner, the motion is propagated through it with a velocity far exceeding that of any other fluid whatever. Thus, even when the quantity is excessively small, as when an electric spark is sent through a glass full of water or of oil, the expansion is so violent as to dissipate the glass into innumerable fragments with great danger to the by-standers, as is observed under the article ELECTRICITY. In violent lightning, where

the electric fluid collects itself into balls, the strength of the explosion is proportionable to the quantity. Every one has heard of the prodigious effects of lightning when it happens to strike buildings, trees, or even the most solid rocks; and in some cases, where the quantity of electricity is still greater than in any flash of lightening, we hear of still more tremendous consequences ensuing. Dr Priestley gives an instance of a large fire-ball (undoubtedly a quantity of electric matter) rolling on the surface of the sea, which after rising up to the top-mast of a ship of war, burst with such violence that the explosion resembled the discharge of hundreds of cannon fired at once. Great damage was done by it; but there is not the least doubt that most of its force was spent on the air, carried down to the sea by the mast and iron-work of the ship. Indeed, considering that in all cases a great part of the force of electric explosions is dissipated in this manner, it may justly be doubted whether they can be measured by any method applicable to the mensuration of other forces. Even in artificial electricity the force is prodigiously great; insomuch that Dr Van Marum calculated that of the great battery belonging to the machine in Teyler's museum to be upwards of 900 pounds.

In those cases where the electrical matter acts like common fire, the force of the explosions, though exceedingly great, is capable of mensuration by comparing the distances to which the bodies are thrown with their weight. This is most evident in volcanoes, where the projections of the burning rocks and lava manifest the greatness of the power, at the same time that they afford a method of measuring it. These explosions, as is shown under the article VOLCANO, are owing to extrication of aerial vapours, and their rarefaction by intense heat. In all of them the air is originally in a state of decomposition, viz. its invisible and solid part is joined with some terrestrial substance. Thus, when fixed air, for instance, is exposed to any pure earth which attracts it, as calcined magnesia, a decomposition instantly takes place. All these vapours are composed of elementary fire and some invisible substance capable of assuming a solid form. The decomposition just mentioned is therefore easily explained; the solid part of the air joins itself to the magnesia, while the elementary fire or latent heat is dissipated, and passes thro' the sides of the vessel. Were it now in our power suddenly to restore the latent heat to the whole of the fixed air, so that it would at once assume its former expansion, a violent explosion would follow. This seems to be precisely the case with the volcanic explosions. An immense quantity of the fixed part of different aerial fluids is united to the various substances found below the surface of the earth. By means of the electric fire which kindles the volcanoes, the aerial fluids are suddenly restored to their elastic state; and not only so, but their natural elasticity is greatly augmented, so that the explosions take place with great violence. The case is the same with gunpowder; only that the condensed air in this case is at first of the dephlogisticated kind, but is quickly phlogisticated by reason of the combustible matters mixed with the nitre, while the heat produced by the inflammation augments the elasticity of the generated air to four times what it usually is, so that the whole force of the explosion is calculated at 1000 times

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Volcanic
explosions
next in
strength.

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In what
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tual explo-
sions take
place.

* See Elaf-
tic Vapours.

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Explosion
of gunpow-
der explain-
ed.

Explosion. times the pressure of the common atmosphere*. Thus the explosions of gunpowder and of volcanoes are essentially the same. The reason of the extreme quickness of those of gunpowder is, that it takes fire so readily by the intimate mixture and combustibility of all the materials. In volcanoes the explosions likewise follow one another very quickly, and are by no means inferior in strength to those of gunpowder: but here the quantity of vapour makes up for the comparative slowness with which it is affected by the heat. Thus, though we could not by any means contrive to fire cannon in quick succession by means of calcareous earth as we can do with gunpowder, yet in the huge furnace of a volcano the elastic matter is supplied in such quantities, that the explosions are in a manner unremitting; and even in ordinary experiments the confinement of aerial vapours has often occasioned violent explosions in chemical vessels. In one case too the extrication of fixed air adds excessively to the force of an explosion, viz. in that of pulvis fulminans. This is compounded of sulphur, saltpetre, and salt of tartar. The latter we know contains much fixed air; and it is probable that the violence of the explosion is occasioned by this air; for the greater quantity of it that the alkaline salt contains, the greater force does it explode with. Fulminating gold emits a quantity of phlogisticated air, to which its explosive power is supposed to be owing, as is explained under the article CHEMISTRY; but that of fulminating silver is so extraordinary, that scarce any force of aerial vapour that can be extricated is likely to produce it, and it seems probable that electricity itself is concerned.

7 Of pulvis fulminans, &c.

8 Explosions by aqueous vapours. Next in strength to the aerial vapours are those of aqueous and other liquids. The most remarkable effects of these are observed in steam-engines; but there is one particular case from which it has been inferred that aqueous steam is vastly stronger than the flame of gunpowder. This is when water is thrown upon melted copper: for here the explosion is so strong as almost to exceed imagination: and the most terrible accidents have been known to happen from such a slight cause as one of the workmen spitting in the furnace where copper was melting. Here, however, it is most probable that a decomposition of the water takes place. That this element can be decomposed or resolved into an aerial and a solid substance, is extremely probable from the experiments of Dr Priestley, as well as those of the French philosophers. The position is indeed denied by the phlogistians; but their arguments appear not to be conclusive; nor is it a fact which militates in the least against their principles. On the supposition that the water is decomposed in the present case, however, the phenomenon in question is easily solved. The water being thrown in substance upon the melted copper, is decomposed by the violent heat; and one part of it adheres to the metal, thus converting it into a kind of calx, while the other is converted into inflammable or some other kind of air, which expanding suddenly, throws the melted metal all about with the greatest violence by means of its re-action.

11 Particularly explained. To understand the manner in which this is accomplished, we must consider some of the principles of GUNNERY laid down by Mr Robins, and related under that article. One of these is, that though the air, in cases of ordinary velocity, makes no great re-

sistance, it is far otherwise where the velocity of the moving body becomes very great. In all cases of explosion also there is in the first instance a vacuum made by the exploding fluid; and consequently the weight of the atmosphere is to be overcome, which amounts to about 15 pounds on every square inch of surface. Supposing the surface of the exploding fluid, then, on that of melted copper to contain an area of 4 square inches, it meets with a resistance of 60 pounds from the atmosphere, and consequently communicates an equal pressure to the fluid metal. Even this must of consequence throw it about, unless the same pressure was exactly diffused over every part of the surface: But much more must this effect be increased by the immense velocity with which the fluid moves, and by which the resistance of the atmosphere is augmented in a prodigious degree, as is explained under the article GUNNERY. The elastic fluid generated is then confined not only by the fluid metal and sides of the furnace, but by the air itself, which cannot get out of the way; so that the whole resembles a cannon closed at the mouth, and filled with inflamed gunpowder. Hence not only the melted metal, but the furnace itself and the adjacent walls of the building, are hurried off as they would be by the firing of a great quantity of gunpowder in a small space, and which is well known to produce analogous effects.

12 In explaining the phenomenon in question, Dr Black supposes that the mere heat of the metal applied to the aqueous steam produces the explosion; and in proof of this alleges, that copper imbibes a greater quantity of heat during fusion than any other metal. Aqueous steam, however, seems to be too slow for producing such sudden and violent effects. Explosions, it is true, will be occasioned by it, but then it must be confined for a very considerable time; whereas the effects of water thrown upon melted copper are instantaneous.

13 It may now be asked, Why such explosions do not take place with any other metal, iron for instance, when water is thrown upon its surface in fusion? In answer to this we must observe, That though water is decomposed by being applied to red-hot iron in the form of steam, yet there is a possibility, that when the same element is applied in substance with the fluid metal, no decomposition may ensue. Something like this indeed happens with copper itself; for, notwithstanding the violent effects which take place on the contact of water in substance with the melted metal, no explosion happens though aqueous steam be blown upon its surface. On the contrary, the upper part of the metal is thus cooled, and forms itself into cakes, which are afterwards taken off, and new ones formed in the same manner; neither does aqueous steam affect red-hot copper in the manner that it does iron in the same state. A decisive proof that the explosion is not occasioned by the mere heat of the aqueous steam may be deduced from the example of melted glass, which produces no explosion though we pour water upon it in that state; and yet the heat of melted glass is undoubtedly equal at least to that of melted copper. It must be observed, however, that in all cases where a very hot body is thrown upon a small quantity of water in substance, an explosion will follow; but here the water is confined and suddenly rarefied into steam, which cannot get away without throwing off the body which confines

14 Explosions when heated substances are thrown upon small quantities of water.

Explosion. confines it. Examples of this kind frequently occur where masons or other mechanics are employed in fastening cramps of iron into stones; where, if there happens to be a little water in the hole into which the lead is poured, the latter will fly out in such a manner as sometimes to burn them severely. Terrible accidents of this kind have sometimes happened in foundries, when large quantities of melted metal have been poured into wet moulds. In these cases, the sudden expansion of the aqueous steam has thrown out the metal with violence; and if any decomposition has taken place at the same time, so as to convert the aqueous into an aerial vapour, the explosion must be still greater.

15
By pouring cold water into boiling oil.

To this last kind of explosion we must refer that which takes place on pouring cold water into boiling or burning oil or tallow. Here the case is much the same whether we pour the oil on the water, or the water on the oil. In the former case, the water which lies at the bottom is rarefied into steam and explodes; in the latter, it sinks down through the oil by its superior specific gravity, and explodes as it passes along. In either case, however, the quantity of aqueous fluid must be but small in proportion to that of the oil: a very great quantity would put out the flame, or destroy the heat, in whatever way we applied it.

16
Explosions in solid substances explained.

Another kind of explosion is that which takes place in solid substances, where we can scarce suppose either aqueous or aerial vapours to be concerned. The most remarkable of these are the *volcanic bombs* mentioned by Sir William Hamilton in the great eruption of Vesuvius in 1779. They were large pieces of lava which burst in pieces like bombs as they fell to the ground; but he does not inform us whether their bursting was attended with any great violence or not. Indeed, amidst such scenes of horror, and the continual tremendous explosions of the volcano, smaller phenomena of this kind would probably be overlooked. Other examples are the *Glass-Tears*, of which an account is given under that article; the bursting of electrical globes, when put in motion; of other glass-vessels spontaneously, and seemingly without any cause; and lastly, the bursting of large cast-metal vessels in the act of cooling. These are all so similar to one another, that it is probable they depend on one general cause. All of them agree in this respect, that the extreme parts of them are considerably cooled, while the internal remain very hot. Thus, in the volcanic bombs, the current of air, formed by their swift passage through it in falling, necessarily carries off a great quantity of heat from the parts which are in contact with it, while the rest are scarce at all cooled. The glass-tears are artificially cooled on the outside by dropping them upon water; and in consequence of this, their explosion is probably more violent in proportion to their bulk than that of the volcanic bombs. Glass-vessels only burst spontaneously when they have not been well annealed; and we know that this bad annealing consists only in applying cold too suddenly to the outside. Something like this probably takes place when cast-iron vessels explode; and we are certain it does so with electrical globes, for these last are not apt to burst if they have been well annealed. In all cases, therefore, there is a remarkable contraction of the outward surface by the cold, while the internal parts remain as much expanded as ever. In this case there must be a continual ef-

fort of that subtle fluid called *elementary fire*, from the internal to the external part, as the contraction gradually proceeds the contrary way. Thus, when a volcanic bomb, for instance, is cooled on the outside, its parts are consolidated so that the internal fluid has not such an easy passage through it as is necessary. In consequence of this it makes a greater effort, which is still farther augmented by the cooling and contraction of the internal parts squeezing the fluid out from among themselves, and forcing it to recoil upon that in the centre, as well as to exert itself against the external part; from which united operation the effect already mentioned at last takes place. This explanation, however, does not hold with respect to electrical globes, glass-tears, or ill-annealed glass: but in order to accommodate it to all these, we have only to remember, that *fire*, and the electric fluid acting from a centre to a circumference, are not in the least different; so that from whatever cause the electric matter is disposed to act in this manner, the same effect will follow, *i. e.* an explosion will take place if the substance does not afford an equally ready passage through all its parts, and that whether any sensible heat is felt in it or not.

The only other kind of explosion we have to take notice of is that produced by inflammable and dephlogisticated air, when mixed together and set on fire. This differs from any of those hitherto considered, because in reality there is an absolute condensation rather than an expansion throughout the whole of the operation; and could the air be made to take fire throughout their whole substance absolutely at the same instant, there would be no explosion, but only a sudden production of heat. From this cause also is derived a very singular phenomenon taken notice of by Dr. Priestley in his late experiments on that subject, recorded in the Phil. Trans. Having inclosed several quantities of inflammable and dephlogisticated air in a copper vessel, firing them afterwards by the electric sparks, he found that the force of the explosion was directed more towards one part of the vessel than another; least on that part where the electrical discharge was made, and most upon that which was farthest from it. This inequality was very considerable; inasmuch that he could not repeat his experiments any number of times without injuring the vessel in that part which was farthest from the discharge. The reason he gives for this is, that the mixture was not fired at the same instant, but first at the place where the discharge was made. This first explosion would have acted equally upon all parts of the vessel, had it not been for the intervention of the air. By the first momentary explosion, however, the air in the farthest part of the vessel was condensed, so that the next explosion was made stronger, while the copper in the fore-part of the vessel had the whole of this strong explosion to resist, the hinder part being but little concerned, as the air in it was condensed and reduced almost to a vacuum.

17
Explosion of inflammable and dephlogisticated air.

18
Singular phenomenon observed by Dr. Priestley.

Though the phenomena of explosions are sometimes very destructive, they are likewise of considerable use in life, by removing obstacles which could scarcely be got the better of by any mechanical power whatever. The principal of these are the blowing up of rocks, the separating of stones in quarries, and other purposes of that

19
Uses to which explosions are applied.

Explosion

20
Attempts
to super-
cede the use
of gunpow-
der.

that kind. The destruction occasioned by them in times of war, and the machines formed upon the principle of explosion for the destruction of the human race, are well known; and if we cannot call these *useful*, we must allow them at least to be necessary evils. For the production of explosions, gunpowder is the only substance that has yet been found to answer; nevertheless, as its use is attended with a considerable expense, several attempts have been made to find out a cheap substitute for it. One of the most remarkable of these was by mixing small quantities of water inclosed in little bladders or some easily destructive vehicles along with a charge of powder. By this contrivance it was hoped, that the water being converted into vapour when the powder was inflamed, would augment the force of the explosion: but instead of this, it was found greatly to diminish it. The reason was evident, viz. that the conversion of the water into steam required so much of the latent heat of the inflamed gunpowder, that enough was not left to give the necessary expansion to the aerial fluid produced. A mixture of inflammable and dephlogisticated air has also been tried; but the explosion here has always been found too weak. In mines, indeed, very terrible effects are produced by such mixture, but in these the quantity is immense; so that the comparative weakness of the mixture cannot be discovered. Electricity therefore seems to be the only resource we have; except by adding ingredients to gunpowder which may increase the strength of it. There can be no doubt indeed that the electric fluid is possessed of sufficient strength to perform every thing we could desire; and electricians have supposed, perhaps justly enough, that a cannon charged with water might, by means of electricity, become more dangerous than one charged with gunpowder: but this fluid is so exceeding capricious, so imperceptible and unmanageable, that the use of it cannot as yet be thought practicable, nor in all probability ever will be so.

21
Effects of
explosions
on the at-
mosphere
and elec-
tric fluid.

The effects of explosions, when violent, are felt at a considerable distance, by reason of the concussions they give to the atmosphere; for, as has been already hinted, all of them act upon the atmospherical fluid with the very same force they exert upon terrestrial substances subjected to their action. Sir William Hamilton relates, that at the explosions of Vesuvius in 1767, the doors and windows of the houses at Naples flew open if unbolted, and one door was burst open though it had been locked. A great quantity of gunpowder being put into the ditch of a fortified city, and set on fire, destroyed part of the wall, and broke down one of the gates. The blowing up of powder-magazines or powder-mills will destroy buildings and kill people, though certainly without the reach of the flame, and untouched by any part of the shattered magazine or mill. But the most curious effect is, that they electrify the air and even glass-windows at a considerable distance. This is always observable in firing the guns of the Tower at London: and some years ago, after an explosion of some powder-mills in the neighbourhood of that city, a great number of people were alarmed by a rattling and breaking of their china-ware; which by the vulgar was taken for a supernatural phenomenon, but undoubtedly was owing to some commotion in the electrical fluid from the violent concussion of the atmosphere. In this respect, however, the effects of

electrical explosions themselves are most remarkable, though not in the uncommon way just mentioned; but it is certain, that the influence of a flash of lightning is diffused for a great way round the place where the explosion happens, producing many very perceptible changes both on the animal and vegetable creation.

Exponent
||
Exposing.

EXPONENT, in algebra, the same with index. See ALGEBRA.

EXPONENT is also used in arithmetic, in the same sense as index or logarithm.

EXPORTATION, the shipping and carrying out of the state wares and commodities for other countries. See the articles COMMERCE, TRADE, and SHIPPING.

EXPOSING, the act of setting a thing to public view. In the Romish church, the sacrament is said to be *exposed* when it is shown in public uncovered on festival days, and during the time of plenary indulgences.

EXPOSING is also used with a farther latitude: thus we say, It is prohibited to expose false and clipped money. Such a house stands very high, and has a delicious prospect; but it is exposed to all the four winds. Such a city being on the frontiers, and not fortified, is exposed to the insults of every party of forces.

EXPOSING of Children, a barbarous custom practised by most of the ancients excepting the Thebans, who had an express law to the contrary, whereby it was made capital to expose children; ordaining at the same time, that such as were not in a condition to educate them should bring them to the magistrates, in order to be brought up at the public expence. Among the other Greeks, when a child was born, it was laid on the ground; and if the father designed to educate his child, he immediately took it up; but if he forbore to do this, the child was carried away and exposed. The Lacedemonians indeed had a different custom: for with them all new-born children were brought before certain triers, who were some of the gravest men in their own tribe, by whom the infants were carefully viewed; and if they were found lusty and well-favoured, they gave orders for their education, and allotted a certain proportion of land for their maintenance; but if weakly or deformed, they ordered them to be cast into a deep cavern in the earth, near the mountain Taygetus, as thinking it neither for the good of the children themselves nor for the public interest, that defective children should be brought up. Many persons exposed their children only because they were not in a condition to educate them, having no intention that they should perish. It was the unhappy fate of daughters especially to be thus treated, as requiring more charges to educate and settle them in the world than sons.

The parents frequently tied jewels and rings to the children they exposed, or any other thing whereby they might afterwards discover them, if Providence took care for their safety. Another design in adorning these infants was either to encourage such as found them to nourish and educate them, if alive; or to give them human burial if dead. The places where it was usual to expose children were such as people frequented most. This was done in order that they might be found, and taken up by compassionate persons who were in circumstances to be at the expence of their education. With this intention the Egyptians and Romans

Exposition || Romans chose the banks of rivers, and the Greeks the highways.

Extant.

EXPOSITION, in general denotes the setting a thing open to public view. See **EXPOSING**.

EXPOSITION, in a literary sense, the explaining an author, passage, writing, or the like, and setting their meaning in an obvious and clear light.

EXPOSITOR, or **EXPOSITORY**, a title which some writers have given to a lesser kind of dictionaries or vocabularies, serving to expound or explain the meaning of the obscure or difficult words of a language. It is also used in the same sense with commentary and paraphrase.

EXPOSTULATION, in rhetoric, a warm address to a person who has done another some injury, representing the wrong in the strongest terms, and demanding redress.

EXPOSURE, in gardening, the situation of a garden wall, or the like, with respect to the points of the compass, as south or east. See **GARDENING**.

Ex-post-facto, in law, denotes something done after another thing that was omitted before. An estate granted may be made good by matter *ex-post-facto*, that was not so at first by election, &c.

EXPRESSED OILS, in chemistry, such oils as are obtained from bodies only by pressing. See **OIL**.

EXPRESSION, in rhetoric, the elocution, diction, or choice of words in a discourse. See **LANGUAGE**, **ORATORY**, and **POETRY**.

EXPRESSION, in music. See **COMPOSITION**.

EXPRESSION, in painting, a natural and lively representation of the subject, or of the several objects intended to be shown.

The expression consists chiefly in representing the human body and all its parts, in the action suitable to it: in exhibiting in the face the several passions proper to the figures, and observing the motions they impress on the external parts. See **PAINTING**.

EXPRESSION Theatrical. See **DECLAMATION**, article iv.

EXPRESSION, in medicine, chemistry, &c. the act of expressing or extracting the juices or oils of plants, fruits, or other matters, by squeezing, wringing, or pressing them in a press. After having let the herbs infuse a due time, their juice must be drawn by expression in a linen cloth or by a press.

EXPULSION, in a general sense, the act of violently driving a person out of any city, society, &c.

EXPULSION, in medicine, the act whereby any thing is forcibly driven out of the place in which it is: thus we say, the expulsion of the fetus in delivery.

EXSICCATION, (formed of *ex* and *siccus*, "dry,") in chemistry, &c. the act of drying up or evaporating the moisture of a thing.

EXPIRATION, in physic, that part of respiration by which the air is expelled or driven out of the lungs. See **ANATOMY**, n° 118. and **RESPIRATION**.

EXSUDATION, or **EXUDATION**, the act of sweating out. In which manner, gums, balsams, &c. are usually produced from trees.

EXTANT, something that still subsists, or is in being. It is but part of the history of Livy, of the writings of Cicero, Cæsar, &c. that are extant, the rest are lost. We have nothing extant of Socrates, though he wrote a great deal.

EXTASY, a transport which suspends the function of the senses, by the intense contemplation of some extraordinary or supernatural object.

EXTASY, in medicine, a species of catalepsy, when a person perfectly remembers, after the paroxysm is over, the ideas he conceived during the time it lasted.

EXTENSION, in philosophy, one of the common and essential properties of a body; or that by which it possesses or takes up some part of universal space, which is called the place of that body. See **METAPHYSICS**, n° 56.

EXTENSOR, an appellation given to several muscles, from their extending or stretching the parts to which they belong. See **ANATOMY**, *Table of the Muscles*.

EXTENT, in law, is used in a double sense. Sometimes it signifies a writ or command to the sheriff for the valuing of lands or tenements; and sometimes the act of the sheriff or other commissioner upon this writ.

Old and New EXTENT, in Scots law. See **LAW**, N° clxvi. 6.

EXTENUATION, the act of diminishing or lessening the bulk or substance of a thing, especially of the human body. Fevers, agues, long abstinences, &c. occasion great extenuations or emaciations.

EXTENUATION, is also a figure in rhetoric, opposite to the hyperbole. The Greeks call it *λιτότης*.

EXTERIOR, or **EXTERNAL**. See **EXTERNAL**.

EXTERMINATION, in general, the extirpating or destroying something.

EXTERMINATION, or **EXTERMINATING**, in algebra, is used for taking away. Thus algebraists speak of exterminating surds, fractions, and unknown quantities out of equations. See *Maclaur. Algebr. part i. chap. 12.* where we have some general theorems for the exterminating unknown quantities in given equations.

EXTERNAL, a term of relation applied to the surface or outside of a body, or that part which appears or presents itself to the eye, touch, &c. in contradistinction to internal.

EXTERNAL is also used to signify any thing that is without-side a man, or that is not within himself, particularly in his mind; in which sense we say, external objects, &c.

EXTINCTION, in general, denotes the putting out or destroying something, as a fire or flame. See *Extinguishing FIRE*.

EXTINGUISHMENT, in law, is a consolidation or union, as where one has due to him a yearly rent out of lands, and afterwards purchases the lands out of which the rent arises; in this case, both the property and the rent being united in one possessor, the rent is said to be extinguished.

EXTIRPATION, (formed of *ex* and *stirps*, "root") the act of pulling up or destroying a thing to the very roots. Among the prayers of the Romish jubilee, there is one for the extirpation of heresy.

EXTIRPATION is also used, in surgery, for cutting off any part entirely; as a wen, &c. or the cauterizing it away, as a wart, &c. by corrosive medicines.

EXTISPEX, in antiquity, the person who drew presages from viewing the intrails of animals offered in sacrifice.

EXTORTION, in law, is an illegal manner of wresting any thing from a man, either by force, menace,

Extasy
|
Extortion.

Extraction
Extravagantes.

nance, or authority. It is also the exaction of unlawful usury, winning by unlawful games, and taking more than is due under pretence of right, as excessive tolls in millers, &c.

At the common law extortion is punishable by fine and imprisonment; and the statute of 3 Eliz 1. c. 30. has enacted, that officers of justice guilty of extortion for the expedition of business, &c. shall render to the party treble value. There are likewise divers other statutes for punishing extortions of sheriffs, bailiffs, gaolers, clerks of the assize and of the peace, attornies, solicitors, &c.

EXTRACT, in pharmacy, is a solution of the purer parts of a mixed body inspissated by distillation or evaporation, nearly to the consistence of honey.

EXTRACT, in matters of literature, is something copied or collected from a book or paper.

EXTRACTION, in chemistry and pharmacy, the operation by which essences, tinctures, &c. are drawn from natural bodies. See EXTRACT.

EXTRACTION, in surgery, is the drawing any foreign matter out of the body by the hand, or by the help of instruments. See SURGERY.

EXTRACTION, in genealogy, implies the stock or family from which a person is descended. See DESCENT.

EXTRACTION of Roots, in algebra and arithmetic, the methods of finding the roots of given numbers or quantities. See ALGEBRA and ARITHMETIC.

EXTRACTOR, in midwifery, an instrument or forceps for extracting children by the head.

EXTRAJUDICIAL, something done out of the proper court, or the ordinary course of law. As when judgment is given in a cause or case, not depending in that court where such judgment is given, or wherein the judge has no jurisdiction.

EXTRAORDINARI, amongst the Romans, was a body of men consisting of a third part of the foreign horse and a fifth of the foot, which was separated from the rest of the forces borrowed from the confederate states with great policy and caution, to prevent any design that they might possibly entertain against the natural forces. A more choice body of men were drawn from among the extraordinarii under the name of *ablecti*. See ABLECTI.

EXTRAORDINARY, something out of the common course.

EXTRAORDINARY Couriers, are those sent express on some urgent occasion.

EXTRAORDINARY Ambassador, or envoy, is such a one as is sent to treat or negotiate some special and important affair, as a marriage, a treaty, confederacy, &c. or even on occasion of some ceremony, as condolence, congratulation, &c.

A gazette, journal, or other news-paper extraordinary, is that published after some great and notable event, containing the detail or particulars thereof, which are not found in the ordinary papers.

EXTRAVAGANTES, those decretal epistles which were published after the CLEMENTINES.

They were so called, because at first they were not digested or ranged with the other papal constitutions, but seemed to be, as it were, detached from the canon law. They continued to be called by the same

name when they were afterwards inserted in the body of the canon law. The first extravagantes are those of John XXII. successor of Clement V. The last collection was brought down to the year 1483, and was called the *common extravagantes*, notwithstanding that they were likewise incorporated with the rest of the canon law.

EXTRAVASATION, in contusions, fissures, depressions, fractures and other accidents of the cranium, is when one or more of the blood-vessels, that are distributed in the dura mater, is broke or divided, whereby there is such a discharge of blood as greatly oppresses the brain and disturbs its office; frequently bringing on violent pain and other mischiefs; and at length death itself, unless the patient is timely relieved. See SURGERY and MEDICINE.

EXTREME is applied to the last and outermost part of any thing; or that which finishes and terminates that side.

EXTREMES, in logic, denote the two extreme terms of the conclusion of a syllogism; viz. the predicate and subject. They are called *extremes*, from their relation to another term, which is a medium or mean between them. The predicate, as being likewise had in the first proportion, is called the *major extremum*, greater extreme; and the subject, as being put in the second or minor proposition, is called the *minus extremum*, lesser extreme. Thus, in the syllogism, man is an animal; Peter is a man, therefore Peter is an animal; the word animal is the greater extreme, Peter the lesser extreme, and the man the medium. See SYLLOGISM.

EXTREME and mean proportion, in geometry, is when a line is so divided, that the whole line is to the greater segment, as that segment is to the other: Or, as Euclid expresseth it, when the line is so divided, that the rectangle under the whole line, and the lesser segment, is equal to the square of the greater segment.

EXTREME Uction. See UCTION.

EXTREMITIES of figures, in painting, is used for the head, hands, and feet. These should be drawn with more nicety and exactness, or more terminated than other parts; and thus help to render the action more expressive.

EXTRINSIC among metaphysicians, is taken in various senses. Sometimes it signifies a thing's not belonging to the essence of another; in which sense, the efficient cause and end of a thing are said to be extrinsic. Sometimes it signifies a thing's not being contained within the capacity of another; in which sense, those causes are called extrinsic which introduce something into a subject from without, as when a fire introduces heat. Sometimes it signifies a thing added or applied to another; in which sense accidents and adherents are said to be extrinsic to the subjects to which they adhere. Sometimes the vision is said to be extrinsic from some form which does not exist in that thing but is adjacent to it, or by some means or other without it.

EXTUBERANCES, in medicine, are swellings or risings up in the flesh or other parts of the body.

EXUBERANCE, (compounded of *ex* and *uber* "plentiful") in rhetoric, a redundancy. See REDUNDANCE and PLEONASM.

EXUDATION. See EXUDATION.

EXVERRÆ,

Extravasation
Exudation.

Exverræ
||
Eye.

EXVERRÆ, in antiquity, a kind of brush used in cleansing houses out of which a dead person had been carried.

EXULCERATION, in medicine, the act of causing or producing ulcers. Thus, arsenic exulcerates the intestines; corrosive humours exulcerate the skin.

EXULCERATION is sometimes used also for an ulcer itself; but more generally for those beginning erosions which wear away the substance, and form ulcers.

EXUVIÆ, among naturalists, denote the cast-off parts or coverings of animals, as the skins of serpents, caterpillars, and other insects.

EXUVIÆ is also used for some shells and other marine bodies, frequently found in the bowels of the earth; supposed to have been deposited there at the deluge, as being the real spoils of once living creatures. See **SHELL**, **FOSSIL**, and **DELUGE**.

EY, in old writers, the same with *insula* "an island;" from which comes *eyet*, a small island or islet, vulgarly called *eyght*.

EYCK. See **BRUGES** (John of.)

EYE, in anatomy. See **ANATOMY**, n° 142.

A new-born child shall be observed, perhaps, never to keep its eyes fixed on any one object, but continually changing from one to another, and if you put your hand before them, the child will not wink. Hence some have thought, that new-born infants have no sight: but this is a mistake; and the true reason why their eyes are in perpetual motion is, that they have not yet acquired the habit of examining one thing at once with their eyes: their not winking at the approach of the hand, arises from their want of experience how easily their eyes may be hurt; but in a few days they get the habit of winking, so that afterwards their eyes do it spontaneously at the approach of danger.

Artificial eyes are made of concave plates of gold, silver, or glass, and are stained so as to resemble the natural eye. They must, when fixed in the orbit, be taken out and cleaned every night, and replaced in the morning. If no more of a diseased eye is removed than what is preternaturally projected, or if enough is left to preserve the muscles unhurt, the artificial eye will have a little motion from the muscles that remain. If the eye does not fit well, it irritates and inflames the other eye; in which case lay it aside, until one can be had that fits better.

Bull's EYE, in astronomy. See **ALDEBARAN**.

EYE of a Block, in naval affairs, that part of the rope-strop which is fastened to some necessary place in the ship: the strop is a sort of wreath or rope formed into a ring, and fixed round the block for the double convenience of strengthening the block and fastening it in any place where it is wanted.

EYE, in agriculture and gardening, signifies a little bud or shoot, inserted into a tree by way of graft. See **ENGRAFTING**.

EYE of a Tree, a small pointed knot to which the leaves stick, and from which the shoots or sprigs proceed. See **GEMMA**.

EYE, a town of Suffolk, 22 miles from Ipswich and

91 from London. It may be called an island, because it is surrounded by a brook near the borders of Norfolk, in the road between Ipswich and Norwich. It was incorporated by king John; has two bailiffs, 10 principal burghesses, 24 common council, a recorder and town-clerk. It is a mean-built place, with narrow streets. The chief manufacture is bone-lace and spinning. Here is, however, a large handsome church; and near it are the ruinous walls of an ancient castle and monastery. The market is on Saturday, the fair on Whit-Monday. It has only sent members to parliament since the reign of Edward IV.

EYE-Bright. See **EUPHRASA**.

EYMOUTH, a town of Scotland in the county of Berwick, formerly fortified to curb the garrison of Berwick, from which place it is distant six miles W. Long. 1. 50. N. Lat. 55. 50. It gave title of baron in the kingdom of Scotland to Churchill, afterwards the great Duke of Marlborough; but he having no male issue, it became extinct in him.

EYRAC, or **IRAC**, **ARABIA**, a province of Turkey in Asia, 345 miles in length, and 190 in breadth; of which **BAGDAD** is the capital.

EYRAC Agemi, the principal province of Persia, anciently called **PARTHIA**.

EYRE, or **EIRE**, in law, the court of itinerant justices. See **ASSIZE**.

EYRIE, in falconry, a brood or nest, a place where hawks build and hatch their young.

EZEKIEL, a canonical book of the Old Testament, referring chiefly to the degenerate manners and corruptions of the Jews of those times. It abounds with fine sentences and rich comparisons, and discovers a good deal of learning in profane matters.

Ezekiel was carried captive to Babylon with Jechoniah, and began his prophecies in the fifth year of the captivity. He was cotemporary with Jeremiah, who prophesied at the same time in Judea. He foretold many events, particularly the destruction of the temple, the fatal catastrophe of those who revolted from Babylon to Egypt, and the happy return of the Jews to their own land.

EZION-GABER. See **ASIONGABER**.

EZRA, a canonical book of the Old Testament; comprehending the history of the Jews from the time of Cyrus's edict for their return, to the 20th year of Artaxerxes Longimanus. It specifies the number of Jews who returned, and Cyrus's proclamation for the rebuilding the temple, together with the laying its foundation, the obstruction it met with, and the finishing thereof in the reign of Darius.

The illustrious author of this book was also the restorer and publisher of the canon of the Old Testament. See **BIBLE**.

The books of Ezra, called in the English version the *First and Second Books of Esdras*, though held by some, particularly the Greeks, for canonical, are thrown by the English church into the number of apocryphal books, being only extant in Greek.

Eye
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Ezra.

F.

F A B

F
Fabian.

F THE fourth consonant, and sixth letter of the alphabet. The letter F is borrowed from the digamma or double gamma of the Ælians, as is evident from the inscription on the pedestal of the Colossus at Delos; and was undoubtedly formed from the old Hebrew vau: and though this letter is not found in the modern Greek alphabet, yet it was in the ancient one, from whence the Latins received it and transmitted it to us.

It is formed by a strong expression of the breath, and joining at the same time the upper-teeth and underlip. It has but one sort of sound, which has a great affinity with *v* and *ph*, the latter being written for it by us in all Greek words, as *philosophy*, &c. though the Italians write it *filosofia*.

The Romans for some time used an inverted F, ⱥ , instead of V consonant, which had no peculiar figure in their alphabet. Thus, in inscriptions we meet with *TERMINA IT, DIAI*, &c. Lipsius and others say, that it was the emperor Claudius who introduced the use of the inverted digamma, or ⱥ : but it did not long subsist after his death; for Quintilian observes, that it was not used in his time.

F, or FA, in music, is the fourth note rising in this order of the gamut, *ut, re, mi, fa*. It likewise denotes one of the Greek keys in music, destined for the bass.

F, in physical prescriptions stands for *Fiat*, or "Let it be done." Thus *f. s. a.* signifies *fiat secundum artem*.

F was also a numeral letter, signifying 40; according to the verse,

Sexta quaterdenos gerit quæ distat ab alpha.

And when a dash was added at top, thus F̄ , it signified forty thousand.

F, in the civil law. Two F's joined together thus, *ff*, signify the pandects. See PANDECTS.

F, in criminal law, a stigma or brand put upon felons with a hot iron, on their being admitted to the benefit of clergy; by stat. 4 H. 7. c. 13.

FABA, in botany. See VICIA.

FABAGO, in botany; a species of bean-caper, or ZYGOPHYLLUM.

FABER, in ichthyology; a species of ZEUS.

FABIAN (Robert), an alderman of the city of London, and sheriff in the year 1494; was a person of learning for the time he lived in, a good poet, and author of a Chronicle of England and France, intitled *The Concordance of Stories*, in two volumes folio, beginning with Brute, and ending with the 20th of Henry VII. 1504. It contains several curious particulars relative to the city of London, not elsewhere to be found. Stowe calls it "a painful labour, to the great honour of the city and of the whole realm." We are told that Cardinal Wolsey caused as many copies of this book as he could procure to be burned, be-

F A B

Fabii,
Fabius.

cause the author had made too clear a discovery of the large revenues of the clergy. Fabian died in 1512.

FABII, a noble and powerful family at Rome, who derived their name from *faba*, a bean, because some of their ancestors cultivated this pulse. They were once so numerous that they took upon themselves to wage a war against the Veientes. They came to a general engagement near the Cremera, in which all the family, consisting of 306 men, were totally slain, year of Rome 277. There only remained one whose tender age had detained him at Rome, and from him arose the noble Fabii in the following ages.

FABIUS (Maximus Rullianus), was the first of the Fabii who obtained the surname of *Maximus*, for lessening the power of the populace at elections. He was master of horse, and his victory over the Samnites in that capacity nearly cost him his life, because he engaged the enemy without the command of the dictator. He was five times consul, twice dictator, and once censor. He triumphed over seven different nations in the neighbourhood of Rome, and rendered himself illustrious by his patriotism.

FABIUS (Rusticus), an historian in the age of Claudius and Nero. He was intimate with Seneca; and the encomiums which Tacitus passes upon his style, make us regret the loss of his compositions.

Q. FABIUS (Maximus), a celebrated Roman, who from a dull and inactive childhood was raised to the highest offices of the state. In his first consulship he obtained a victory over Liguria, and the fatal battle of Thrasymenus occasioned his election to the dictatorship. In this important office he began to oppose Hannibal, not by fighting him in the open field, like his predecessors, but he continually harassed his army by countermarches and ambuscades, from which he received the surname of *Cunctator*, or *Delayer*. Hannibal sent him word, that "If he was as great a captain as he would be thought, he ought to come into the plain and give him battle." But Fabius coldly replied, "That if he was as great a captain as he would be thought, he would do well to force him to fight." Such operations for the commander of the Roman armies gave offence to some; and Fabius was even accused of cowardice. He, however, continued firm in his first resolutions; and patiently bore to see his master of horse raised to share the dictatorial dignity with himself, by means of his enemies at home. When he had laid down his office of dictator, his successors, for a while, followed his plan; but the rashness of Varro, and his contempt for the operations of Fabius, occasioned the fatal battle of Cannæ. Tarantum was obliged to surrender to his arms after the battle of Cannæ; and on that occasion the Carthaginian enemy observed that Fabius was the Hannibal of Rome. When he had

made

Fabius
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Fabri.

made an agreement with Hannibal for the ransom of the captives, which was totally disapproved by the Roman senate, he sold all his estates to pay the money, rather than forfeit his word to the enemy. The bold proposals of young Scipio to go and carry the war from Italy to Africa, was rejected by Fabius as chimerical and dangerous. He did not, however, live to see the success of the Roman arms under Scipio, and the conquest of Carthage by measures which he treated with contempt and heard with indignation. He died in the 100th year of his age, after he had been five times consul, and twice honored with a triumph. The Romans were so sensible of his great merit and services, that the expences of his funeral were defrayed from the public treasury.—His son bore the same name, and showed himself worthy of his noble father's virtues. During his consulship he received a visit from his father on horseback in the camp. The son ordered the father to dismount: and the old man cheerfully obeyed, embracing his son, and saying, "I wished to know whether you knew what it is to be consul." He died before his father, and Cunctator with the moderation of a philosopher delivered a funeral oration over the dead body of his son.

FABIUS, styled *Pictor*, a Roman general and historian. He first introduced painting at Rome, and having caused the walls of the temple of Health to be painted, some authors have erroneously reckoned him a painter. He died about 216 B. C.

FABLE, a tale, or feigned narration, designed either to instruct or divert, disguised under the allegory of an action, &c.

Fables were the first pieces of wit that made their appearance in the world; and have continued to be highly valued, not only in times of the greatest simplicity, but in the most polite ages of the world. Jotham's fable of the trees is the oldest that is extant, and as beautiful as any that have been made since. Nathan's fable of the poor man is next in antiquity. We find Æsop in the most distant ages of Greece; and in the early days of the Roman commonwealth, we read of a mutiny appeased by the fable of the belly and the members. As fables had their rise in the very infancy of learning, they never flourished more than when learning was at its greatest height; witness Horace, Boileau, and Fontaine.

Fable is the finest way of giving counsel, and most universally pleasing, because least shocking; for, in the reading of a fable, a man thinks he is directing himself, whilst he is following the dictates of another, and consequently is not sensible of that which is the most unpleasing circumstance in advice. Besides, the mind is never so much pleased as when she exerts herself in any action that gives her an idea of her own abilities; this natural pride of the soul is very much gratified in the reading of fable.

FABLE, is also used for the plot of an epic or dramatic poem; and is, according to Aristotle, the principal part, and, as it were, the soul of the poem. See POETRY.

FABRI (Honorius), a laborious Jesuit born in the diocese of Bellay, distinguished himself by his skill in philosophy and the mathematics, and by writing a great number of books. The most curious of which treat of geometry, optics, the loadstone, the motion of

the earth, the ebbing and flowing of the sea, &c. He died at Rome in 1688.

FABRIANO (Gentile da), painter of history, was born at Verona in 1332, and became a disciple of Giovanni da Fiesole. In that early age of painting he rendered himself very famous, and was employed to adorn a great number of churches and palaces at Florence, Urbino, Siena, Perugia, and Rome, but particularly in the Vatican; and one picture of his, representing the Virgin and Child, attended by Joseph, which is preserved in the church of S. Maria Maggiore, was highly commended by Michael Angelo. By order of the Doge and Senate of Venice, he painted a picture in the great council-chamber, which was considered as so extraordinary a performance, that his employers granted him a pension for life, and conferred on him the highest honour of their state, which was, the privilege of wearing the habit of a noble Venetian. He died in 1412.

FABRIC, in general denotes the structure or construction of any thing; but particularly of buildings, as a church, hall, house, &c. See ARCHITECTURE.

FABRIC LANDS, those formerly given towards rebuilding or repairing of cathedrals and other churches; for anciently almost every body gave more or less, by his will, to the fabric of the parish-church where he dwelt.

FABRICIUS (C.), a celebrated Roman, who in his first consulship, year of Rome 470, obtained several victories over the Samnites and Lucanians, and was honored with a triumph. The riches which were acquired in those battles were immense, the soldiers were liberally rewarded by the consul, and the treasury was enriched with 400 talents. Two years after, Fabricius went as ambassador to Pyrrhus, and refused with contempt presents, and heard with indignation offers, which might have corrupted the fidelity of a less virtuous citizen. Pyrrhus had occasion to admire the magnanimity of Fabricius; but his astonishment was more powerfully awakened when he saw him make a discovery of the perfidious offers of his physician, who pledged himself to the Roman general for a sum of money to poison his royal master. To this greatness of soul was added the most consummate knowledge of military affairs, and the greatest simplicity of manners. Fabricius never used rich plate at his table. A small salt-cellar, the feet of which were horn, was the only silver vessel which appeared in his house. This contempt of luxury and useless ornaments Fabricius wished to inspire among the people; and during his censorship he banished from the senate Cornelius Ruffinus, who had been twice consul and dictator, because he kept in his house more than ten pound weight of silver plate. Such were the manners of the conqueror of Pyrrhus, who observed that he wished rather to command those that had money, than possess it himself. He lived and died in the greatest poverty. His body was buried at the public charge, and the Roman people were obliged to give a dowry to his two daughters when they had arrived to years of maturity.

FABRICIUS (George), a learned German, born at Chemnitz in Misnia, in 1516. After a liberal education, he visited Italy in quality of a tutor to a young nobleman; and, examining all the remains of antiquity with great accuracy, compared them with their description

Fabiano
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Fabricius.

Fabricius *scriptions in Latin writers. The result of these observations was his work intitled *Roma*, containing a description of that city. He afterwards settled at Misenum, where he conducted a great school to the time of his death in 1571. He was also the author of a great number of sacred Latin poems, wrote seven books of the *Annals of Misia*, three of the *Annals of Meissen*, and *Travels*.*

Fabulous.

FABRICIUS (Jerom), a celebrated physician in the latter end of the 16th century (surnamed *Aquapendente*, from the place of his birth), was the disciple and successor of Fallopius. He chiefly applied himself to surgery and anatomy, which he professed at Padua for 40 years with extraordinary reputation. The republic of Venice settled a large pension upon him, and honoured him with a gold chain and a statue. He died in 1603; leaving behind him several works which are much esteemed.

FABRICIUS (John Albert), one of the most learned and laborious men of his age, was born at Leipzig in 1668. He was chosen professor of eloquence at Hamburg in 1699, and was made doctor of divinity at Kiel. His works are numerous; and he died at Hamburg in 1736, after a life spent in the severest literary application to collect and publish valuable remains of ancient learning.

FABRICIUS (Vincent), born at Hamburg in 1613, was a good poet, a great orator, an able physician, and a learned civilian. He was for some time counsellor to the bishop of Lubec, and afterwards burgo-master and syndic of the city of Dantzic; from whence he was 13 times sent deputy into Poland, where he died at Warsaw in 1657, during the diet of that kingdom. The most complete edition of Fabricius's poems and other works was published at Leipzig in 1685, under the direction of his son Frederic Fabricius.

FABRICIUS (Baron), one of the finest gentlemen of his time, and known to the public by his letters relating to the transactions of Charles XII. of Sweden during his residence in the Ottoman empire, was descended from a good family in Germany. He was taken early into the service of the court of Holstein: and was sent in a public character to the king of Sweden whilst he was at Bender; where he soon acquired the good graces of that prince. He accompanied him in his exercises; gave him a turn for reading; and it was out of his hand Charles snatched Boileau's satires, when he tore out those that represented Alexander the Great as a madman. Fabricius was also in favour with Stanislaus, and with king George I. whom he accompanied in his last journey to Hanover, and was with him when he died. A translation of his letters was published in London 1761.

FABROT (Charles Hannibal), one of the most celebrated civilians of his time, was born at Aix in 1681; and acquired an extraordinary skill in the civil and canon law, and in the belles lettres. He published the *Basilica*, or Constitutions of the Emperors of the East, in Greek and Latin, with learned notes, in seven vols folio; and editions of *Cedrenus*, *Nicetas*, *Anastasi*, *Bibliothecarius*, *Constantine Manasses*, and *Cujas*, with learned and curious notes.

FABULOUS, something consisting of, or connected with, a fable.

FABULOUS Age, among ancient historians. See AGE.

FACE, the surface, or first side which a body presents to the eye. We say, the *face* of the earth, of the waters, &c. Polyhedrons have several *faces*. A die, or cube, has six *faces*.

FACE, is particularly used for the visage of an animal, and especially of man; and comprehends, in the latter, all that part of the head which is not covered with the common long hair. The Latins call it *facies*, *vultus*, *os*, &c.

The human face is called the *image of the soul*, as being the seat of the principal organs of sense; and the place where the ideas, emotions, &c. of the soul are chiefly set to view. Pride and disdain are shown in the eye-brows, modesty on the cheeks, majesty in the forehead, &c. It is the face shows the sex, age, temperament, health, or disease, &c.

The face, considered as the index of the passions, habits, &c. of the person, makes the subject of physiognomy. See **PHYSIOGNOMY**.

FACE, among painters and artists, is used to denote a certain dimension of the human body, adopted for determining the proportion which the several parts should bear to one another. See **DRAWING**.

FACE, in the military art, a word of command, intimating to turn about: thus, *face to the right*, is to turn upon the left heel a quarter-round to the right, and, *face to the left*, is to turn upon the right heel a quarter-round to the left.

FACIES HIPPOCRATICA, in medicine, is when the nostrils are sharp, the eyes hollow, the temples low, the tips of the ears contracted and cold, the forehead dry and wrinkled, and the complexion pale or livid.—The Hippocratic face is chiefly observed towards the period of phthises and other consumptions, and is held a sure prognostic of death. If it appears within three days after the attack of an acute disease, it is deemed to indicate death.

FACTION, a cabal or party formed in a state, city, or company.

FACTION, in antiquity, a name given to the different companies of combatants in the circus. They were four, viz. the white, the red, the green, and the blue; to which Domitian added another of purple colour. They were so denominated from the colour of the liveries they wore; and were dedicated, according to M. Aur. Cassiodorus, to the four seasons of the year; the green being consecrated to spring, the blue to winter, the red to summer, and the white to autumn. It appears from ancient inscriptions, that each faction had its procurators and physician; and from history, that party-rage ran so high among them, that in a dissension between two factions, in the time of Justinian, almost 40,000 men lost their lives in the quarrel.

FACTITIOUS, any thing made by art, in opposition to what is the produce of nature. Thus, factitious cinnabar is opposed to native cinnabar.

FACTOR, in commerce, is an agent employed by merchants residing at other places, to buy or sell goods, or negotiate bills, or transact any kind of business on their account; and intitled to a certain allowance for his trouble.

A supercargo differs from a factor in this: The business of the former is limited to the care of a particular cargo; he goes along with it, and generally returns when his business is completed: the latter has a fixed

Face
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Factor.

Factor.

fixed residence abroad, and executes business for different merchants. But their duties, and the circumstances for which they are accountable, are the same.

The duty of a factor is to procure the best intelligence of the state of trade at his place of residence; of the course of exchange; of the quantity and quality of goods at market, their present price, and the probability that it may rise or fall; to pay exact obedience to the orders of his employers; to consult their advantage in matters referred to his direction; to execute their business with all the dispatch that circumstances admit; to be early in his intelligence, distinct in his accounts, and punctual in his correspondence.

A factor's power is either absolute or limited. Though intrusted with ample discretionary powers, he is not warranted to take unreasonable or unusual measures, or do any thing contrary to his employer's interest; but it is incumbent on the employer, if he challenge his proceedings, to prove that he could have done better, and was guilty of wilful mismanagement.

When a factor's power is limited, he must adhere strictly to his orders. If he exceeds his power, though with a view to his employer's interest he is liable for the consequence. For example, if he gives a credit when not empowered, or longer credit if not empowered, for the sake of a better price, and the buyer proves insolvent, he is liable for the debt. A factor has no power to give credit unless authorised: But if the goods consigned be generally sold on credit at the place of consignment, the factor will be vindicated for selling at the usual credit, unless expressly restricted.

Although opinion will never justify the factor for departing from orders, necessity sometimes will. If he be limited not to sell goods under a certain price, and the goods be perishable, and not in a situation for being kept, he may sell them, to prevent their destruction, even under the price limited.

A factor is never warranted to deal on trust, except with persons in good credit at the time. If the employer challenge the debtors, it is incumbent on him to prove that their bad circumstances was known at the time of sale; and the factor will be vindicated, if he trusted them at the same time for goods of his own.

If the factor sells his employer's goods on trust, and, after the day of payment is elapsed, receive payment from the purchaser for a debt of his own, he becomes liable in equity for the debt.

In case of bankruptcy, the factor ought immediately to lay attachments, and advise his employers; and he cannot withdraw his attachments, nor compound debts without orders.

If a factor sells goods belonging to different merchants to the same person, and the buyer proves insolvent, they shall bear the loss in equal proportions; and, if the buyer has paid part before his insolvency, without specifying for which, the payment ought to be distributed in equal proportions; but, if the days of payment be fixed, and part of the debts only due, the payment ought to be applied, in the first place, to such debts as were due.

If he makes a wrong entry at the custom-house, and the goods be seized in consequence thereof, he must bear the loss, unless the error be occasioned by a mistake in the invoice, or letter of advice.

The owner bears the loss of goods seized when attempted to be smuggled by his orders; but the factor complying with an unlawful order is liable in such penalties as the laws exact.

If a factor saves the duty of goods due to a foreign prince, he shall have the benefit; for, if detected, he bears the loss.

If a factor sells goods bought by his employer's orders for his own advantage, the employer may recover the benefit, and the factor shall be amerced for the same.

If a factor receives bad money in payment, he bears the loss; but if the value of the money be lessened by the government, the employer bears the loss.

A factor is not liable for goods spoiled, robbed, or destroyed by fire.

If a factor receives counterfeit jewels from his employer, and sells them, the employer is liable to indemnify him for any penalties he may incur.

If a factor be ordered to make insurance, and neglect it, and the subject be lost, he is liable to make it good, providing he had effects in his hands.

If a factor buys goods for his employer, his bargain shall be binding on the employer.

In case of a factor's insolvency, the owner may reclaim his goods; and, if they be sold on trust, the owner (and not the factor's creditors) shall recover payment of the debts.

FACTOR, in multiplication, a name given to the multiplier and multiplicand, because they constitute the product. See ARITHMETIC.

FACTORAGE, called also *commission*, is the allowance given to factors by the merchant who employs them.

A factor's commission in Britain, on most kinds of goods, is $2\frac{1}{2}$ per cent.: on lead, and some other articles, 2 per cent.; in Italy, $2\frac{1}{2}$ per cent., in France, Holland, Spain, Portugal, Hamburgh, and Dantzic, 2 per cent.; in Turkey, 3 per cent.; in North America, 5 per cent. on sales, and 5 per cent. in returns; in the West Indies, 8 per cent. for commission and storage. In some places, it is customary for the factors to insure the debts for an additional allowance, generally $1\frac{1}{2}$ per cent. In that case, they are accountable for the debt when the usual term of credit is expired.

Factorage on goods is sometimes charged at a certain rate per cask, or other package, measure, or weight, especially when the factor is only employed to receive or deliver them.

FACTORY is a place where a considerable number of factors reside, to negotiate for their masters or employers. See FACTOR.

The most considerable factories belonging to the British are those established in the East-Indies, Portugal, Turkey, &c. There are also English factories established at Hamburgh, Petersburg, Dantzic, and in Holland; all endowed with certain privileges.

FACTUM, in arithmetic, the product of two quantities multiplied by each other.

FACULÆ, in astronomy, certain bright and shining parts, which the modern astronomers have, by means of telescopes, observed upon or about the surface of the sun: they are but very seldom seen.—The word is pure Latin; being a diminutive of *fax*, "torch;" and supposed

Factor

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Faculæ.

Faculty
Faernus.

posed to be here applied from their ppearing and dis-
appearing by turns.

FACULTY, in law, a privilege granted to a per-
son, by favour and indulgence, of doing what, by law,
he ought not to do.

For granting these privileges, there is a court under
the archbishop of Canterbury, called the *court of the*
faculties. The chief officer of this court is styled *master*
of the faculties, and has a power of granting dispensa-
tions in divers cases; as, to marry without the bans
being first published, to eat flesh on days prohibited, to
ordain a deacon under age, for a son to succeed his
father in his benefice, a clerk to hold two or more
livings, &c.

FACULTY, in the schools, a term applied to the dif-
ferent members of an university, divided according to
the arts and sciences taught there: thus in most uni-
versities there are four faculties, viz. 1. Of arts, which
include humanity and philosophy. 2. Of theology.
3. Of physic. And, 4. Of civil law.

FACULTY of Advocates. See **ADVOCATES**.

FACULTY is also used to denote the powers of the
human mind, viz. understanding, will, memory, and
imagination. See **METAPHYSICS**.

FÆCES, in chemistry, the gross matter, or sedi-
ment, that settles at the bottom after distillation, fer-
mentation, and the like.—The fæces of wine are com-
monly called **LEES**.

FÆCES, in medicine, the excrements voided by stool.
See **EXCREMENTS**.

FÆCULENT, in general, is applied to things
abounding with fæces or dregs; thus the blood and
other humours of the human body are said to be fæ-
culent, when without that purity which is necessary to
health.

FAENZA, a city of Romania in Italy, with a bi-
shop's see. It is an ancient place, and has undergone
various revolutions. The river Amona washes its walls,
and passes between the city and the suburbs, which are
joined by a stone-bridge defended by two good towers.
The city is remarkable for its earthen ware, which is
the best in all Italy.

FAERNUS (Gabriel), a native of Cremona in Ita-
ly, was an excellent Latin poet and critic of the 16th
century. He was so skilled in all parts of polite lite-
rature, that the cardinal de Medicis, afterward Pope
Pius IV. was particularly fond of him. He was the
author of some Latin elegies; of 100 Latin fables, se-
lected from the ancients, written in iambic verse; and
of several pieces of criticism, as *Censura emendationum*
Livianarum, *De Metris Comicis*, &c. He was re-
markably happy in decyphering manuscripts, and re-
storing ancient authors to their purity: he took such
pains with Terence in particular, that Bentley has
adopted all his notes in the edition he gave of that
writer. He died at Rome in 1561, and Thuanus,
who wrote his eloge, says, that the learned world was
greatly obliged to him, yet had been still more so, if,
instead of suppressing the then unknown fables of Phæ-
drus, for fear of lessening the value of his own Latin
fables, written in imitation of Æsop, he had been con-
tent with imitating them. M. Perault, however, who
translated Faernus's fables into French, has defended
him from this imputation, by affirming that the first
MS. of Phædrus's fables, found in the dust of an old

library, was not discovered till about 30 years after
Faernus's death.

FAGARA, IRON-WOOD: A genus of the mono-
gynia order, belonging to the tetrandria class of plants;
and in the natural method ranking under the 43d or-
der, *Dumosa*. The calyx is quadrifid, the corolla tetra-
petalous, and the capsule bivalved and monospermous.
There are five species, all natives of the warm parts
of America, rising with woody stems more than 20 feet
high. They are propagated by seeds; but in Great
Britain must be kept continually in a stove.

PAGE (Raimond de la), an excellent designer and
engraver, highly esteemed by Carlo Maratti, was born
at Toulouse in 1648. He applied himself to design-
ing, through inclination, in spite of his parents; and
had no master nor any assistance: but his superior ta-
lents supplied the want of them, and he became one of
the best designers in Europe; but his performances
on licentious subjects are the most esteemed. It is re-
ported of this artist, that he never made use of money,
but contracted debts; and when the accounts were
brought him, he drew upon the back of the bills, and
bid the owners sell the drawings to connoisseurs for the
amount, by which they were generally great gainers.
Several of those drawings are in the cabinets of the
curious. He led a loose, depraved life; which his re-
peated debaucheries put an end to at the age of 42.

FAENSA, a city and bishop's see of Italy, situated
in the pope's territories, about 30 miles east of Bologna:
E. Long. 12. 38. and N. Lat. 44. 30.

FAGGOT, in times of popery in Britain, was a badge
worn on the sleeve of the upper garment of such per-
sons as had recanted or abjured what was then termed
heresy; being put on after the person had carried a fag-
got, by way of penance, to some appointed place of
solemnity. The leaving off the wear of this badge was
sometimes interpreted a sign of apostacy.

FAGGOTS, among military men, persons hired by
officers, whose companies are not full, to muster and
hide the deficiencies of the company; by which means
they cheat the king of so much money.

FAGIUS (Paul), *alias* **BUCHIN**, a learned Prote-
stant minister, born at Rheinabem in Germany in
1504. He was a schoolmaster at Isna; but afterwards
became a zealous preacher, and wrote many books.
The persecution in Germany menacing danger to all
who did not profess the Romish doctrines, he and Bu-
cer came over to England in 1549, at the invitation of
archbishop Cranmer, to perfect a new translation of the
scriptures. Fagius took the old Testament, and Bu-
cer the New, for their respective parts; but the design
was at that time frustrated by the sudden deaths of
both. Fagius died in 1550, and Bucer did not live
above a year after. Their bodies were dug up and
buried in the reign of queen Mary.

FAGONIA, in botany: A genus of the monogy-
nia order, belonging to the decandria class of plants;
and in the natural method ranking under the 14th or-
der, *Gruinales*. The calyx is pentaphyllous; the pe-
tals are five and heart-shaped; the capsule is quin-
quelocular, ten-valved, with the cells monospermous.
There are three species, natives of Spain, Crete, and
Arabia.

FAGOPYRUM, or **BUCK-WHEAT**. See **POLY-
GONUM**.

FAGUS,

Fagara
Fagopy-
rum.

Fagus.

FAGUS, the BEECH-TREE: A genus of the polyandria order, belonging to the monoecia class of plants; and in the natural method ranking under the 50th order, *Amentacea*. The male calyx is quinquefid and campanulated; there is no corolla; the stamina are 12: The female calyx is quinquedentated; there is no corolla; there are three styles; the capsule (formerly the calyx) is muricated and quadrivalved; the seeds, two in number. There are three species. 1. The *sylvaticus*, or beech-tree, rises 60 or 70 feet high, and has a proportionable thickness, branching upward into a fine regular head, garnished with oval serrated leaves, with flowers in globular catkins, succeeded by angular fruit called *mast*. 2. The *castanea*, or chestnut-tree, hath a large upright trunk growing 40 or 50 feet high, branching regularly round into a fine spreading head, garnished with large spear-shaped acutely serrated leaves naked on the under side, having flowers in long amentums, succeeded by round prickly fruit, containing two or more nuts. 3. The *pumila*, dwarf chestnut-tree, or chinkapin, rises eight or ten feet high, with a branching shrubby stem, and oval spear-shaped and acutely serrated leaves, hoary on the under side.

Culture. The first is very easily raised from the mast or seed. "For woods (says Evelyn), the beech must be governed as the oak:—In nurseries, as the ash; sowing the masts in autumn, or later, even after January, or rather nearer the spring, to preserve them from vermin, which are very great devourers of them. But they are likewise to be planted of young seedlings to be drawn out of the places where the fruitful trees abound." Millar says, the season for sowing the masts "is any time from October to February, only observing to secure the seeds from vermin when early sowed, which, if carefully done, the sooner they are sown the better, after they are fully ripe." Hanbury orders a sufficient quantity of masts to be gathered about the middle of September, when they begin to fall: these are to be "spread upon a mat in an airy place six days to dry; and after that you may either proceed to sow them immediately, or you may put them up in bags in order to sow them nearer the spring; which method I would rather advise, as they will keep very well, and there will be less danger of having them destroyed by mice or other vermin, by which kinds of animals they are greatly relished." They must be sown in beds properly prepared about an inch deep. In the first spring many of the young plants will appear, whilst others will not come up till the spring following. Having stood two years in the seminary, they should be removed to the nursery, where they may remain till wanted.

The propagation of the second species is also chiefly from seeds. Evelyn says, "Let the nuts be first spread to sweat, then cover them in sand; a month being past, plunge them in water, and reject the swimmers; being dried for 30 days more, sand them again, and to the water-ordeal as before. Being thus treated until the beginning of spring or in November, set them as you would do beans; and, as some practise it, drenched for a night or more in new milk; but with half this preparation they need only to be put into the holes with the point upmost, as you plant tulips. If you design to set them in winter or autumn, I counsel you to enter them in their husks, which being every

Fagus.

way armed, are a good protection against the mouse, and a providential integument."—"Being come up, they thrive best unremoved, making a great stand for at least two years upon every transplanting; yet if needs you must alter their station, let it be done about November." Millar cautions us against purchasing foreign nuts that have been kiln-dried, which (he says) is generally done to prevent their sprouting in their passage; therefore he adds, "If they cannot be procured fresh from the tree, it will be much better to use those of the growth of England, which are full as good to sow for timber or beauty as any of the foreign nuts, though their fruit is much smaller." He also recommends preserving them in sand, and proving them in water. In setting these seeds or nuts (he says) "the best way is to make a drill with a hoe (as is commonly practised for kidney-beans) about four inches deep, in which you should place the nuts at about four inches distance, with their eye uppermost; then draw the earth over them with a rake, and make a second drill at about a foot distance from the former, proceeding as before, allowing three or four rows in each bed.—In April (he does not mention the time of sowing) these nuts will appear above ground; you must therefore observe to keep them clean from weeds, especially when young: in these beds they may remain for two years, when you should remove them into a nursery at a wider distance. The best time for transplanting these trees is either in October or the latter end of February, but October is the best season: the distance these should have in the nursery is three feet row from row, and one foot in the rows. If these trees have a downright tap-root, it should be cut off, especially if they are intended to be removed again: this will occasion their putting out lateral shoots, and render them less subject to miscarry when they are removed for good. The time generally allowed them in the nursery is three or four years, according to their growth; but the younger they are transplanted, the better they will succeed. Young trees of this sort are very apt to have crooked stems; but when they are transplanted out and have room to grow as they increase in bulk they will grow more upright, and their stems will become straight, as I have frequently observed where there have been great plantations."—Hanbury follows Millar almost literally; except that he mentions February as the time of sowing; and recommends that the young plants, a year after they have been planted in the nursery, be cut down to within an inch of the ground; which (he says) "will cause them to shoot vigorously with one strong and straight stem." There is one material objection against sowing chestnuts in drills, which are well known to serve as guides or conductors to the field-mouse, who will run from one end to the other of a drill without letting a single nut escape her: we rather recommend setting them with a dibble, either promiscuously or a quincunx, at about six inches distance. Evelyn says, that coppices of chestnuts may be thickened by layering the tender young shoots; but adds, that "such as spring from the nuts and marrons are best of all." There is a striped-leaved variegation which is continued by budding; and the French are said to graft chestnuts for their fruit; but Millar says, such grafted tree are unfit for timber. The chestnuts will thrive

Fagus. thrive upon almost any soil which lies out of the water's way; but disaffects wet moory land.

The method of propagating the dwarf chefnut is from seeds, which we receive from America. These should be planted in drills, as soon as they arrive, in a moistish bed of rich garden-mould. If the seeds are good, they will come up pretty soon in the spring. After they appear, they will require no trouble, except keeping them clean from weeds, and watering them in dry weather. They may stand in the seed-bed two years, and be afterwards planted in the nursery-ground, at a foot asunder and two feet distance in the rows; and here when they are got strong plants, they will be fit for any purpose.

Properties and Uses. In stateliness and grandeur of outline, the beech vies with the oak. Its foliage is peculiarly soft and pleasing to the eye; its branches are numerous and spreading; and its stem waxes to a great size. The bark of the beech is remarkably smooth, and of a silvery cast; this, added to the splendor and smoothness of its foliage, gives a striking neatness and delicacy to its general appearance. The beech, therefore, standing singly, and suffered to form its own natural head, is highly ornamental; and its leaves varying their hue as the autumn approaches, renders it in this point of view still more desirable. In point of actual use the beech follows next to the oak and the ash: it is almost as necessary to the cabinet-makers and turners (especially about the metropolis), as the oak is to the ship-builder, or the ash to the plough and cart-wright. Evelyn nevertheless condemns it in pointed and general terms; because "where it lies dry, or wet and dry, it is exceedingly obnoxious to the worm." He adds, however, "but being put ten days in water, it will exceedingly resist the worm." The natural soil and situation of the beech is upon dry, chalky, or limestone heights: It grows to a great size upon the hills of Surry and Kent; as also upon the declivities of the Cotswold and Stroudwater hills of Gloucestershire, and flourishes exceedingly upon the bleak banks of the Wye, in Hereford and Monmouthshires, England; where it is much used in making charcoal. In situations like those, and where it is not already prevalent, the beech, whether as a timber-tree or as an underwood, is an object worthy the planter's attention.

The mast, or seeds, yield a good oil for lamps; and are a very agreeable food to squirrels, mice, and swine. The fat of swine fed with them, however, is soft, and boils away unless hardened by some other food. The leaves gathered in autumn, before they are much injured by the frosts, make much better mattresses than straw or chaff; and last for seven or eight years. The nuts, when eaten by the human species, occasion giddiness and headach; but when well dried and powdered, they make wholesome bread. They are sometimes roasted and substituted for coffee. The poor people in Silesia use the expressed oil instead of butter.

The chefnut tree sometimes grows to an immense size. The largest in the known world are those which grow upon Mount Ætna in Sicily*. At Tortworth in Gloucestershire, is a chefnut tree 52 feet round. It is proved to have stood there ever since the year 1150, and was then so remarkable that it was called the great chefnut of Tortworth. It fixes the boundary of the ma-

nor, and is probably near 1000 years old. As an ornamental, the chefnut, though unequal to the oak, the beech, and the esculus, has a degree of greatness belonging to it which recommends it strongly to the gardener's attention. Its uses have been highly extolled; and it may deserve a considerable share of the praise which has been given it. As a substitute for the oak it is preferable to the elm: For door-jambs, window-frames, and some other purposes of the house-carpenter, it is nearly equal to oak itself; but it is very apt to be shakey, and there is a deceitful brittleness in it which renders it unsafe to be used as beams, or in any other situation where an uncertain load is required to be borne. It is universally allowed to be excellent for liquor casks; as not being liable to shrink, nor to change the colour of the liquor it contains: it is also strongly recommended as an underwood for hop-poles, flakes, &c. Its fruit too is valuable, not only for swine and deer, but as a human food: Bread is said to have been made of it. Upon the whole, the chefnut, whether in the light of ornament or use, is undoubtedly an object of the planter's notice.

FAINT-ACTION, in law, a feigned action, or such as, although the words of the writ are true, yet, for certain causes, the plaintiff has no title to recover thereby.

FAINT-Pleader, in law, a covinous, false, or collusive manner of pleading, to the deceit of a third person.

FAINTING. See **LIPOTHYMIA**.

FAINTS, in the distillery, the weak spirituous liquor that runs from the still in rectifying the low wines after the proof-spirit is taken off.

FAINTS, is also the last running of all spirits distilled by the alembic. The clearing the worm of these is so essential a point in order to the obtaining a pure spirit by the subsequent distillation, that all others are fruitless without it.

FAIR, a greater kind of market, granted to a town, by privilege, for the more speedy and commodious providing of such things as the place stands in need of.

The word fair is formed from the French *foire*, which signifies the same thing; and *foire* is by some derived from the Latin *forum*, "market;" by others from the Latin *ferie*, because anciently fairs were always held in the places where the wakes or feasts of the dedications of churches, called *ferie*, were held. See **FERIE**.

It is incident to a fair, that persons shall be free from being arrested in it for any other debt or contract than what was contracted in the same; or, at least, promised to be paid there. These fairs are generally kept once or twice a year; and, by statute, they shall not be held longer than they ought, by the lords thereof, on pain of their being seized into the king's hands, &c. Also proclamation is to be made, how long they are to continue; and no person shall sell any goods after the time of the fair is ended, on forfeiture of double the value, one fourth to the prosecutor and the rest to the king. There is a toll usually paid in fairs on the sale of things, and for stallage, picage, &c.

Fairs abroad are either free, or charged with toll and impost. The privileges of free fairs consist chiefly, first, in that all traders, &c. whether natives or foreigners, are allowed to enter the kingdom, and are under the royal protection, exempt from duties, impositions,

Faint,
Fair.

* See *Etna*, upon Mount Ætna in Sicily*. At Tortworth in n^o 18. and Plate CLXXXV Gloucestershire, is a chefnut tree 52 feet round. It is proved to have stood there ever since the year 1150, and was then so remarkable that it was called the great chefnut of Tortworth. It fixes the boundary of the ma-

Fair.

positions, tolls, &c. Secondly, that merchants, in going or returning, cannot be molested or arrested, or their goods stopped. They are established by letters-patent from the prince. Fairs, particularly free fairs, make a very considerable article in the commerce of Europe, especially that of the Mediterranean, and inland parts of Germany, &c.

The most celebrated fairs in Europe are those, 1. Of Francfort, held twice a-year, in spring and autumn: the first commencing the Sunday before Palm-Sunday, and the other on the Sunday before the eighth of September. Each lasts 14 days, or two weeks; the first of which is called the *week of acceptance*, and the second the *week of payment*. They are famous for the sale of all kinds of commodities; but particularly for the immense quantity of curious books no where else to be found, and whence the booksellers throughout all Europe used to furnish themselves. Before each fair, there is a catalogue of all the books to be sold thereat, printed and dispersed, to call together purchasers: though the learned complain of divers unfair practices therein; as fictitious titles, names of books purely imaginary, &c. beside great faults in the names of the authors, and the titles of the real books. —2. The fairs of Leipzig, which are held thrice a-year: one beginning on the first of January; another three weeks after Easter; and a third after Michaelmas. They hold 12 days a-piece; and are at least as considerable as those of Francfort. 3. The fairs of Novi, a little city in the Milanese, under the dominion of the republic of Genoa. There are four in the year, commencing on the second of February, the second of May, the first of August, and second of September. Though the commodities bought and sold here be very considerable; yet, what chiefly contributes to render them so famous, is the vast concourse of the most considerable merchants and negociants of the neighbouring kingdoms, for the transacting of affairs and settling accounts. 4. The fairs of Riga, whereof there are two in the year; one in May, and the other in September. They are much frequented by the English, Dutch, and French ships, as also from all parts of the Baltic. The best time for the sale of goods at Riga is during the fairs. Since the building of the famous city of Petersburg, these fairs have suffered some diminution. 5. Fair of Archangel, during which all the trade foreigners have with that city is managed. It holds a month, or six weeks at most, commencing from the middle of August. The Muscovite merchants attend here from all parts of that vast empire; and the English, Dutch, French, Swedish, Danish, and other ships in the port of that city, on this occasion, ordinarily amount to 300. But this is no free fair as the rest are: The duties of exportation and importation are very strictly paid, and on a very high footing. 6. The fair of St. Germain, one of the suburbs of Paris, commencing on the third of February, and holding till Easter; though it is only free for the first 15 days. 7. The fairs of Lyons, which Mons. du Chesne, in his antiquity of cities, would insinuate, from a passage in Strabo, were established by the Romans; though it is certain, the fairs, as they now stand, are of a much later date. There are three in the year, each lasting 20 days, and free for ever. They begin on Easter Monday, the 26th

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of July, and the first of December. 8. Fair of Cui-bray, a suburb of the city of Falaise, in the Lower Normandy. It is said to have been established by William the Conqueror, in consideration of his being born at Falaise. It commences on the 16th of August; and holds 15 days free by charter, and longer by custom. 9. Fair of Beaucaire, held partly in a city of that name, in Languedoc, and partly in the open country, under tents, &c. It commences on the 22d of July, and only holds for three days: yet it is the greatest and most celebrated of all the fairs in that part of Europe, both for the concourse of strangers from all parts of the world, and for the traffic of all kind of goods: the money returned in these three days amounting sometimes to above six millions of livres.

The fairs of Porto-bello, Vera Cruz, and the Havana, are the most considerable of all those in America. The two first last as long as the flota and galleons continue in those parts; and the last is opened as soon as the flota or galleons arrive there upon their return for Spain; this being the place where the two fleets join. See *FLOTA*, and *GALLEONS*.

The principal British fairs are, 1. Sturbridge-fair, near Cambridge, by far the greatest in Britain, and perhaps in the world. 2. Bristol has two fairs, very near as great as that of Sturbridge. 3. Exeter. 4. West-Chester. 5. Edinburgh. 6. Wheyhill; and, 7. Burford-fair; both for sheep. 8. Pancras fair, in Staffordshire, for saddle-horses. 9. Bartholemew fair, at London, for lean and Welch black cattle. 10. St. Faith's, in Norfolk, for Scotch runts. 11. Yarmouth fishing-fair for herrings, the only fishing fair in Great-Britain. 12. Ipswich butter-fair. 13. Woodborough-hill, in Dorsetshire, for west-country manufactures, as kerseys, druggits, &c. 14. Two cheese fairs at Chipping Norton: with innumerable other fairs, besides weekly markets, for all sorts of goods, as well their own as of foreign growth.

FAIR, in sea language, is used for the disposition of the wind, when it is favourable to a ship's course, in opposition to that which is contrary or foul. The term *fair* is more comprehensive than *large*, and includes about 16 or 18 points of the compass; whereas *large* is confined to the beam or quarter, that is, to a wind which crosses the keel at right angles, or obliquely from the stern, but never to one right a-stern.

FAIR (Isle), a small island lying between Orkney and Shetland, 10 or 12 leagues E. N. E. from the former; and seven, eight, or 10 leagues, S. W. from the latter. It is three miles long, and scarce half a mile broad, very craggy, with three high rocks which are visible both from Orkney and Shetland. There is in this island a small quantity of arable land, which is very fruitful and well manured; and there might be considerably more, but the inhabitants are obliged to reserve it for peat and pasturage. They have for the size of the island a great many sheep, and those very good and fat: but they have no kind of moor-fowl or other game; but there is great plenty of sea and water fowl, and all kinds of fish upon their coasts. There is in effect no port, though they have two that are nominally so: one at the south end, which is full of rocks, where only small boats can lie, and that but indifferently; the other at the north-east end, larger and safer in summer, so that it serves commodiously enough for their

M

their

Fair.

Fair,
Fairfax.

their fishery. The duke of Medina Sidonia, when commander of the famous Spanish armada in 1588, was wrecked on the east coast of this island. The ship broke to pieces, but the duke and 200 men made their escape. They lived there so long, that both they and the inhabitants were almost famished. At length the duke and the poor remains of his people were carried over to the main land of Shetland, and then to Dunkirk, by one Andrew Humphry, for which service Andrew was rewarded with 3000 merks. This island produced to its former proprietor between 50 l. and 60 l. Sterling. It was sold at Edinburgh, on the 20th of June 1766, for about 850 l. to James Stewart of Burgh, Esq.

FAIR-Curve, is a winding line, used in delineating ships, whose shape is varied, according to the part of the ship which it is intended to describe.

FAIR-Way, in sea language, the path or channel of a narrow bay, river, or haven, in which ships usually advance in their passage up and down; so that if any vessels are anchored therein, they are said to lie in the fair-way.

FAIRFAX (Edward,) natural son of Sir Thomas Fairfax, was an English poet who lived in the reigns of Elizabeth and James I. He wrote several poetical pieces, and was an accomplished genius. Dryden introduces Fairfax with Spencer, as the leading writers of the times; and even seems to give the preference to the former in the way of harmony, when he observes that Waller owned himself indebted for the harmony of his numbers to Fairfax's *Godfrey of Boulogne*. He died about the year 1632, at his own house called *New-hall*, in the parish of Fuyston, between Denton and Knareborough, and lies under a marble stone.

FAIRFAX (Sir Thomas), general of the parliamentary forces against Charles I. in 1644. See (*History of*) **BRITAIN**, n° 127. *et seq.* He resigned in 1650; after which he lived privately, till he was invited by general Monk to assist him against Lambert's army. He cheerfully embraced the occasion; and, on the third of December 1659, appeared at the head of a body of gentlemen of Yorkshire; when, upon the reputation of his name, a body of 12,000 men forsook Lambert and joined him. He was at the head of the committee appointed by the House of Commons to attend king Charles II. at the Hague, to desire him speedily to return to England; and having readily assisted in his restoration, returned again to his seat in the country; where he lived in a private manner till his death, which happened in 1671, in the 60th year of his age.—He wrote, says Mr. Walpole, memorials of Thomas lord Fairfax, printed in 1699; and was not only an historian, but a poet. In Mr. Thoresby's museum were preserved in manuscript the following pieces: The Psalms of David, the Canticles, the Songs of Moses, and other parts of Scripture, versified; a poem on Solitude; Notes of Sermons, by his lordship, by his lady daughter of Horace lord Vere, and by their daughter Mary the wife of George the second duke of Buckingham; and a Treatise on the Shortness of Life. But of all lord Fairfax's works, says Mr. Walpole, the most remarkable were the verses he wrote on the horse on which Charles II. rode to his coronation, and which had been bred and presented to the king by his lordship. How must that

merry monarch, unapt to keep his countenance on more serious occasions, have smiled at this awkward homage from the old victorious hero of republicanism and the covenant! He gave a collection of manuscripts to the Bodleian library.

FAIRFORD, a town in Gloucestershire, with a market on Thursdays. It is remarkable for the church, which has curious painted glass-windows. They are said to have been taken in a ship by John Tame, Esq; towards the end of the 15th century, who built the church for their sake. They are preserved entire, and the figures are extremely well drawn and coloured. They represent the most remarkable histories in the Old and New Testament. They are frequently visited by travellers, and many go on purpose to view them, as one of the greatest curiosities in England. The painter was Albert Durer. W. Long. 1. 46. N. Lat. 51. 42.

FAIRY, in ancient traditions and romances, signifies a sort of deity, or imaginary genius, conversant on the earth, and distinguished by a variety of fantastical actions either good or bad.

They were most usually imagined to be women of an order superior to human nature, yet subject to wants, passions, accidents, and even death; sprightly and benevolent while young and handsome; morose, peevish, and malignant, if ugly, or in the decline of their beauty; fond of appearing in white, whence they are often called the *white ladies*.

Concerning these imaginary beings, no less a person than Jervaise of Tilleberry, marshall of the kingdom of Arles, who lived in the beginning of the 13th century, writes thus in a work inscribed to the emperor Otho IV. "It has been asserted by persons of unexceptionable credit, that fairies used to choose themselves gallants from among men, and rewarded their attachment with an affluence of worldly goods; but if they married, or boasted of a fairy's favours, they as severely smarted for such indiscretion." The like tales still go current in Languedoc; and, throughout the whole province, there is not a village without some ancient seat or cavern which had the honour of being a fairy's residence, or at least some spring where a fairy used to bathe. This idea of fairies has a near affinity with that of the Greeks and Romans, concerning the nymphs of the woods, mountains, and springs; and an ancient scholiast on Theocritus says, "The nymphs are demons which appear on the mountains in the figure of women;" and what is more surprising, the Arabs and other orientals have their *ginn* and *peri*, of whom they entertain the like notions.

But fairies have been likewise described as of either sex, and generally as of minute stature, though capable of assuming various forms and dimensions. The most charming representation imaginable of these children of romantic fancy, is in the *Midsummer-night's Dream* of Shakespear; in referring to which, we will no doubt have been anticipated by the recollection of almost every reader.

Spenser's Fairy Queen is an epic poem, under the persons and characters of fairies. This sort of poetry raises a pleasing kind of horror in the mind of the reader, and amuses his imagination with the strangeness and novelty of the persons who are represented in it; but, as a vehicle of instruction, the judicious object to it

Fairford,
Fairy.

Fairy,
Faith.

it, as not having probability enough to make any moral impression.

The belief of fairies still subsists in many parts of Britain. The

"Swart fairy of the mine," (of German extraction), has scarce yet quitted their subterraneous works; (*vid. next article.*) *Puck*, or *Robin Good-Fellow*, still haunts many of their villages. And in the highlands of Scotland, new-born children are watched till the christening is over, lest they should be stolen or changed by some of these fantastical existences.

FAIRY of the Mine; an imaginary being, an inhabitant of mines. The Germans believed in two species; one fierce and malevolent; the other a gentle race, appearing like little old men dressed like the miners, and not much above two feet high. These wander about the drifts and chambers of the works; seem perpetually employed, yet do nothing; some seem to cut the ore, or fling what is cut into vessels, or turn the windlafs; but never do any harm to the miners, unless provoked; as the sensible *Agricola*, in this point credulous, relates in his book *de Animantibus Subterraneis*.

FAIRY Circle or Ring, a phenomenon pretty frequent in the fields, &c. supposed by the vulgar to be traced by the fairies in their dances. There are two kinds of it; one of about seven yards in diameter, containing a round bare path, a foot broad, with green grass in the middle of it. The other is of different bigness, encompassed with a circumference of grass. Mess. *Jessop* and *Walker*, in the *Philosophical Transactions*, ascribe them to lightning; which is thought to be confirmed by their being most frequently produced after storms of that kind, as well as by the colour and brittleness of the grass roots when first observed. Lightning, like all other fires, moves round, and burns more in the extremity than in the middle: the second circle arises from the first, the grass burnt up growing very plentifully afterwards. Others maintain that these circles are made by ants, which are frequently found in great numbers therein.—Mr. *Cavallo*, who hath published an esteemed treatise on electricity, does not think that lightning is at all concerned in the formation of them: "They are not (says he) always of a circular figure; and, as I am informed, they seem to be rather beds of mushrooms than the effects of lightning."

FAITH, in philosophy and theology, that assent which we give to a proposition advanced by another, the truth of which we do not immediately perceive from our own reason or experience; or it is a judgment or assent of the mind, the motive whereof is not any intrinsic evidence, but the authority or testimony of some other who reveals or relates it. Hence, as there are two kinds of authorities and testimonies, the one of God, and the other of man, faith becomes distinguished into divine and human.

Divine FAITH, is that founded on the authority of God; or it is that assent we give to what is revealed by God.

The objects of this faith, therefore, are matters of revelation. See **REVELATION** and **RELIGION**.

Human FAITH, is that whereby we believe what is told us by men. The object hereof is matter of human testimony and evidence. See **METAPHYSICS**.

FAITH, in practical theology, makes the first of the theological virtues or graces.

Faith in God, in this sense, denotes such a conviction of his being, perfections, character, and government, as produces love, trust, worship, obedience, and resignation.

Faith in Christ, as it has been defined by some, is a mere assent to the gospel as true; according to others, it signifies such a persuasion that he is the Messiah, and such a desire and expectation of the blessings which he has promised in his gospel to his sincere disciples, as engage the mind to fix its dependence upon him, and subject itself to him in all the ways of holy obedience. See **THEOLOGY**.

Faith, likewise, in respect to futurity, is a moral principle, implying such a conviction of the reality and importance of a future state, as is sufficient to regulate the temper and conduct.

FAITH, or *Fidelity*, (*Fides*), was deified by the ancient Romans, and had a temple in the Capitol consecrated to her by *Attilius Catalinus*. Her priests wore white veils: unbloody sacrifices were offered to her, and the greatest oaths were taken in her name. *Horace* clothes her in white, places her in the retinue of *Fortune*, and makes her the sister of *Justice*, *Od. 24, 35. l. i.* Public faith is represented in a great number of medals; sometimes with a basket of fruit in one hand, and some ears of corn in the other; and sometimes holding a turtle-dove. But the most usual symbol is two hands joined together. The inscriptions are generally, *Fides Augusti*, *Fides Exercitus*, or *Fides Militum*, &c.

FAITHFUL, an appellation assumed by the Mahometans. See **MAHOMETANS**.

FAITHORN (William), an ingenious English artist, a native of London, was the disciple of *Peak* the painter, and worked with him three or four years. At the breaking out of the civil war, *Peak* espoused the cause of his sovereign; and *Faithorn*, who accompanied his master, was taken prisoner by the rebels at *Baringhouse*, from whence he was sent to London, and confined in *Aldersgate*. In this uncomfortable situation he exercised his graver; and a small head of the first *Villars* duke of *Buckingham*, in the style of *Melan*, is reckoned among his performances at that time. The solicitations of his friends in his favour at last prevailed; and he was released from prison, with permission to retire to the continent. In France he found protection and encouragement from the *Abbé de Marolles*; and at this time it was that he formed an acquaintance with *Nanteuil*, from whose instructions he derived very considerable advantages. About the year 1650 he returned to England, and soon after married the sister of a Captain *Cround*. By her he had two sons; *Henry*, who was a bookseller, and *William* an engraver in mezzotinto. *Faithorn* opened a shop near *Temple-Bar*, where he sold not only his own engravings, but those of other English artists, and imported a considerable number of prints from Holland, France, and Italy. About the year 1680, he retired from his shop, and resided in *Printing-House Yard*; but he still continued to work for the booksellers, especially *Royston*, *Martin*, and *Peake* the younger, his former master's brother. He painted portraits from the life in crayons; which art

Faith

Faithorn.

Fakirs he learned of Nanteuil during his abode in France. He also painted in miniature; and his performances in both these styles were much esteemed. His spirits were broken by the indiscretion and dissipation of his son William; and a lingering consumption put an end to his life in 1691. He wrote a book *Upon Drawing, Graving, and Etching*, for which he was celebrated by his friend Thomas Flatman the poet.

FAKIRS, Indian monks or friars. They out-do the severity and mortification of the ancient Anchorets or Solitaries. Some of them make a vow of continuing all their lifetime in one posture, and keep it effectually. Others never lie down; but continue in a standing posture all their lives, supported only by a stick, or rope under their arm-pits. Some mangle their bodies with scourges and knives. They look upon themselves to have conquered every passion, and triumphed over the world; and accordingly scruple not, as if in a state of innocence, to appear entirely naked in public.

The common people of East India are thoroughly persuaded of the virtue and innocence of the fakirs; notwithstanding which, they are accused of committing the most enormous crimes in private.

They have also another kind of fakirs, who do not practise such severities: these flock together in companies, and go from village to village, prophesying, and telling fortunes. They are wicked villains, and it is dangerous for a man to meet them in a lone place: nevertheless the Indian idolaters have them in the utmost veneration. They make use of drums, trumpets, and other musical instruments, to rouse their souls, and work themselves up to an artificial ecstacy, the better to publish their pretended prophecies.

Some of the votaries of these sages most devoutly kiss their privy parts; and they receive this monstrous declaration of respect with a kind of ecstatic pleasure. The most sober and discreet Indians consult them in this preposterous attitude; and their female votaries converse with them a considerable time with the most indecent freedom.

The fire they burn is made of cow's dung, dried in the sun. When they are disposed to sleep, they repose themselves on cow's dung, and sometimes on ordure itself. They are so indulgent towards every living creature, that they suffer themselves to be over-run with vermin, or stung by insects, without the least reluctance or complaint.

It is more than probable, these Indian friars have some secret art to lull their senses asleep, in order to render themselves in a great measure insensible of the excessive torments they voluntarily undergo. Ovington assures us, that "as he was one day in an assembly of fakirs, he observed that they drank opiates infused in water; the intoxicating virtue whereof was enough to turn their brain."

The garment of the chief fakirs consists of three or four yards of orange-coloured linen, which they tie round them, and a tyger's skin, which hangs over their shoulders. Their hair is woven in tresses, and forms a kind of turban. The superior of the fakirs is distinguished from the rest by having a greater number of pieces in his garment, and by a chain of iron, two yards long, tied to his leg. When he designs to rest in any place, a garment is spread upon the ground; on which

he sits and gives audience, whilst his disciples publish his virtues.

Some persons of quality in India have become fakirs: among others, five great lords belonging to the court of Cha-gehan, Mogul of the Indies. It is said, there are about two millions of fakirs in the East Indies.

FALASHA, a people of Abyssinia, of Jewish origin, described by Mr Bruce, who was at great pains to acquaint himself with their history by cultivating the friendship of the most learned persons among them he could meet with.

According to the accounts received from them, the Falasha are the descendants of those Jews who came from Palestine into Ethiopia, as attendants of Menilek the son of the queen of Sheba or Saba by Solomon. They agree in the relations given by the Abyssinians of that prince, which are mentioned under the article **ETHIOPIA**; but deny that the posterity of those who came with Menilek ever embraced the Christian religion, as the Abyssinians say they did. They say, that at the decline of the Jewish commerce, when the ports of the Red Sea fell into the hands of other nations, and no intercourse took place betwixt them and Jerusalem, the Jewish inhabitants quitted the sea-coasts and retired into the province of Dembea. While they remained in the cities on the Red Sea, they exercised the trades of brick and tile making, pottery, thatching houses, &c. and after leaving the sea-coasts, they chose the country of Dembea on account of the plenty of materials it afforded for exercising the trades they professed. Here they carried the art of pottery to a great degree of perfection, multiplied exceedingly, and became very numerous and powerful about the time that the Abyssinians were converted to Christianity. As this event was accounted by them an apostacy from the true religion, they now separated themselves from the Abyssinians, and declared one Phineas, of the line of Solomon, their king. Thus they say, they have still a prince of the house of Judah for their sovereign, though their assertion is treated with contempt, and a nick-name bestowed on the Falashan family by the other Abyssinians. About the year 960, the queen of this people, after extirpating the Abyssinian princes on the rock Damo, assumed the sovereignty of the whole empire, which they retained for some time, as is related under the article **ETHIOPIA**; but their power being by degrees reduced, they were obliged to take up their residence among the rugged mountains of Samen; one of which they chose for their capital, and which has ever since been called the *Jews Rock*. About the year 1600, they were almost entirely ruined by an overthrow from the Abyssinians, in which both their king and queen were slain; since which time they have been in subjection to the emperors of that country, but are still governed by their own princes. When Mr Bruce was in Abyssinia they were supposed to amount to about 100,000 effective men. Gideon and Judith were the names of the king and queen at that time; and these, according to our author seem to be preferred to others for the royal family.

The language of this people is very different from the Hebrew, Samaritan, or any other which the Jews ever spoke in their own country. On being interrogated

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gated concerning it by Mr Bruce, they said, that it was probably one of those spoken by the nations on the Red Sea, among whom they had settled at their first coming. They arrived in Abyssinia speaking Hebrew, and with the advantage of having books in that language; but had now forgot it, which indeed is not to be wondered at, as they had lost their Hebrew books, and were entirely ignorant of the art of writing. At the time of their leaving Jerusalem, they were in possession both of the Hebrew and Samaritan copies of the law; but when their fleet was destroyed in the time of Rehoboam, and no farther communication with Jerusalem took place, they were obliged to use translations of the scriptures, or those copies which were in possession of the shepherds, who, they say, were all Jews before the time of Solomon. On being asked, however, where the Shepherds got their copy, and being told, that, notwithstanding the invasion of Egypt by Nebuchadnezzar, there was still a communication with Jerusalem by means of the Ishmaelite Arabs through Arabia, they frankly acknowledged that they could not tell; neither had they any memorials of the history either of their own or any other country; all that they believed in this case being derived from mere tradition, their histories, if any existed, having been destroyed by the famous Moorish Captain Gagné, of whom an account is given under the article ETHIOPIA. They say, that the first book of Scripture they ever received was that of Enoch; and they place that of Job immediately after it, supposing that patriarch to have lived soon after the flood. They have no copy of the Old Testament in the Falasha language, what they make use of being in that of Geez. This is sold to them by the Abyssinian Christians, who are the only scribes in that country. No difference takes place about corruptions of the text; nor do the Falasha know any thing of the Jewish Talmud, Targum, or Cabala.

FALCADE, in the manege, the motion of a horse when he throws himself upon his haunches two or three times, as in very quick curvets; which is done in forming a stop and half stop. See STOP.

FALCATED, something in the form of a sickle: thus, the moon is said to be *falcated* when she appears horned.

FALCO, in ornithology, a genus belonging to the order of accipitres, the characters of which are these: The beak is crooked, and furnished with wax at the base: the head is thick-set with feathers, and the tongue is cloven. The eagle and hawk form this genus.

Plate exc.

1. The leucocephalus, bald, or white-headed eagle of Catesby, is ash-coloured, with the head and tail white; the iris of the eye is white, over which is a prominence covered with a yellow skin; the bill and the cere or wax are yellow, as are likewise the legs and feet; and the talons are black. Though it is an eagle of small size, it weighs nine pounds, is strong and full of spirit, preying on lambs, pigs, and fawns. They always make their nests near the sea or great rivers, and usually upon old dead pine or cypress trees, continuing to build annually on the same tree till it falls. Though he is so formidable to all birds, yet he suffers them to build near his royal nest without molestation; particularly the fishing hawk, herons, &c. which all build on high trees, and in some places are so near one

another, that they appear like a rookery. The nests are very large and very fetid by reason of the reliques of their prey. Lawson says they breed very often, laying again under their callow young; whose warmth hatches the eggs. In Bering's Isle they make their nests on the cliffs near six feet wide and one thick; and lay two eggs in the beginning of July. This species inhabits both Europe and America; but is more common in the latter. Besides flesh, it feeds also on fish. This, however, it does not procure for itself; but sitting in a convenient spot, watches the dividing of the osprey into the water after a fish, which the moment it has seized the bald eagle follows close after, when the osprey is glad to escape by dropping the fish from his bill; and such is the dexterity of the former, that it often seizes the prey before it can fall to the ground. Catesby says the male and female are much alike.

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2. The ossifragus, or sea-eagle, with yellow wax, and half-feathered legs: it is about the size of a peacock; the feathers are white at the base, iron-coloured in the middle, and black at the points; and the legs are yellow. It is found in several parts of Great Britain and Ireland. Mr Willoughby tells us, that there was an æry of them in Whinfield Park, Westmoreland; and the bird soaring in the air with a cat in its talons (which Barlow drew from the very fact which he saw in Scotland), is of this kind. The cat's resistance brought both animals to the ground, when Barlow took them up; and afterwards caused the event to be engraved in the 36th plate of his Collection of Prints. Turner says, that in his days this bird was too well known in England; for it made horrible destruction among the fish. All authors indeed agree, that it feeds principally on fish, which it takes as they are swimming near the surface, by darting itself down upon them; not by diving or swimming, as some authors have pretended, who furnish it for that purpose with a one webbed foot to swim with, and another divided foot to take its prey with. Martin, speaking of what he calls the great eagles of the Western Isles, says, that they fasten their talons in the back of the fish, commonly of salmon, which are often above the water, or very near the surface. Those of Greenland will even take a young seal out of the water. Turner, abovementioned, says, that the fishermen were fond of anointing their baits with the fat of this bird, imagining that it had a peculiar alluring quality: they were even superstitious enough to believe, that wherever the sea-eagle hovered over a piece of water, the fish (as if charmed) would rise to the surface with their bellies upwards; and in that manner present themselves to him. It also preys on water fowl. This species is also frequent in North America, and was also met with in Botany Island by Captain Cooke.

3. The chrysaetos, or golden eagle, weighs about 12 pounds, and is in length about three feet, the wings when extended measuring about seven feet four inches. The sight and sense of smelling are very acute: the head and neck are clothed with narrow, sharp-pointed feathers, of a deep brown colour bordered with tawney; the hind part of the head in particular is of a bright rust colour. These birds are very destructive to fawns, lambs, kids, and all kinds of game; particularly in the breeding season, when they bring a vast quantity

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tity of prey to their young. Smith, in his *History of Kerry*, relates, that a poor man in that country got a comfortable subsistence for his family, during a summer of famine, out of an eagle's nest, by robbing the eaglets of the food the old ones brought; whose attendance he protracted beyond the natural time, by clipping the wings and retarding the flight of the former. It is very unsafe to leave infants in places where eagles frequent; there being instances in Scotland of two being carried off by them; but, fortunately, the theft was discovered in time, and the children were restored unhurt out of the eagles nests. In order to extirpate these pernicious birds, there is a law in the Orkney isles, which entitles every person that kills an eagle to a hen out of every house in the parish where it was killed. Eagles seem to give the preference to the carcases of dogs and cats. People who make it their business to kill those birds, lay one or other of these carcases by way of bait; and then conceal themselves within gunshot. They fire the instant the eagle alights: for she, that moment, looks about before she begins to prey. Yet, quick as her sight may be, her sense of hearing seems still more exquisite. If hooded crows or ravens happen to be nearer the carrion, and resort to it first, and give a single croak, the eagle is certain of instantly repairing to the spot.

Eagles are remarkable for their longevity, and for their power of sustaining a long abstinence from food. Mr Keyser relates, that an eagle died at Vienna after a confinement of 104 years. This pre-eminent length of days probably gave occasion to the saying of the Psalmist, "Thy youth is renewed like the eagle's." One of this species, which was nine years in the possession of Owen Holland, Esq; of Conway, lived 32 years with the gentleman who made him a present of it; but what its age was when the latter received it from Ireland is unknown. The same bird also furnishes us with a proof of the truth of the other remark; having once, through the neglect of servants, endured hunger for 21 days without any sustenance whatever.

4. The fulvus, or white-tailed eagle of Edwards, has the whole plumage of a dusky brown: the breast marked with triangular spots of white, but which are wanting in the British kind: the tail is white, tipped with black; but in young birds dusky, blotched with white: the legs are covered to the toes with soft rust-coloured feathers. These birds inhabit Hudson's Bay and northern Europe as far as Drontheim. They are found on the highest rocks of the Uralian chain, where it is not covered with wood; but are most frequent on the Siberian, where they make their nest on the loftiest rocks. They are rather inferior in size to the sea-eagle; but are generous, spirited, and docile. The independent Tartars train them for the chase of hares, foxes, antelopes, and even wolves. The use is of considerable antiquity; for Marco Polo, the great traveller of 1269, observed and admired the diversion of the great cham of Tartary; who had several eagles, which were applied to the same purposes as they are at present. The Tartars also esteem the feathers of the tail as the best they have for pluming their arrows. This species is frequent in Scotland; where it is called the *black eagle*, from the dark colour of its plumage. It is very destructive to deer, which it will seize between the horns; and by incessantly beating it about the

eyes with its wings, soon makes a prey of the harassed animal. The eagles in the isle of Rum have nearly extirpated the stags that used to abound there. They generally build in clefts of rocks near the deer-forests; and make great havoc not only among them, but also among the white hares and ptarmigans. Mr Willoughby gives the following curious account of the nest of this species. "In the year of our Lord 1668, in the woodlands near the river Darwent, in the peak of Derbyshire, was found an eagle's nest made of great sticks, resting one end on the edge of a rock, the other on two birch trees; upon which was a layer of rushes, and over them a layer of heath, and upon the heath rushes again; upon which lay one young one and an addle egg; and by them a lamb, a hare, and three heath poult. The nest was about two yards square, and had no hollow in it. The young eagle was black as a hobby, of the shape of a goshawk, almost of the weight of a goose, rough-footed, or feathered down to the foot: having a white ring about the tail."

5. The cyaneus, or hen-harrier, with white wax, yellow legs, a whitish blue body, and a white ring round the eyes and throat. It is the blue hawk of Edwards, and is a native of Europe and Africa. These birds are extremely destructive to young poultry and to the feathered game: they fly near the ground, skimming the surface in search of prey. They breed on the ground, and never are observed to settle on trees.

6. The albiulla, or cinereous eagle, is inferior in size to the golden eagle; the head and neck are of a pale ash-colour; the body and wings cinereous, clouded with brown; the quill feathers very dark; the tail white; the legs feathered but little below the knees, and of a very bright yellow. The male is of a darker colour than the female. The bill of this species is rather straighter than is usual in the eagle; which seems to have induced Linnæus to place it among the *vultures*. But Mr Pennant observes, that it can have no title to be ranked with that genus, the characteristic mark of which is, that the head and neck are either quite bare, or only covered with down; whereas this bird is wholly feathered. This species is in size equal to the black eagle, and inhabits Europe as high as Iceland and Lapmark. It is common in Greenland, but does not extend to America; or, according to Mr Pennant, if it does, it varies into the white-headed eagle, to which it has great affinity, particularly in its feeding much on fish; the Danes therefore call it *Fiske-orn*. It is common in the south of Russia, and about the Volga, as far as trees will grow; but is very scarce in Siberia. It inhabits Greenland the whole year, sitting on the rocks with flagging wing, and flies slowly. It makes its nest on the lofty cliffs, with twigs, lining the middle with mosses and feathers; lays two eggs; and sits in the latter end of May or beginning of June. These birds prey on young seals, which they seize as they are floating on the water; but oftentimes, by fixing their talons in an old one, they are overmatched, and drawn down to the bottom, screaming horribly. They feed also on fish, especially the lumpfish, and a sort of trout; on ptarmigans, auks, and eider ducks. They sit on the top of rocks, attentive to the motion of the diving birds; and with quick eyes observe their course by the bubbles which rise to the surface of the water, and catch the fowls as they rise for

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for breath. The Greenlanders use their skins for cloathing next to their bodies; eat the flesh; and keep the bill and feet for amulets. They kill them with the bow or take them in nets placed in the snow properly baited; or tempt them by the fat of seals, which the eagles eat to an excess; which occasions such a torpidity as to make them an easy prey. They are common in Scotland and the Orkneys; where they feed on fish as well as on land animals.

7. The crying eagle (Arct. Zool. p. 215.), with a dusky bill and yellow cere; the colour of the plumage is a ferruginous brown; the coverts of the wings and scapulars are elegantly varied with oval white spots; the primaries dusky, the ends of the greater white; the breast and belly are of a deeper colour than the rest of the plumage, streaked downwards with dull yellow; the tail is dark brown, tipped with dirty white; the legs are feathered to the feet, which are yellow. The length of the bird is two feet.—This species is found in many parts of Europe, but not in Scandinavia; is frequent in Russia and Siberia; and extends even to Kamtschatka. It is less generous and spirited than other eagles, and is perpetually making a plaintive noise; from which it was styled by the ancients

* Arist. Hist. an. lib. 9.
+ Lib. 10.
c. 3.

planga & clanga; and *anataria*, from its preying on ducks, which Pliny† describes with great elegance. The Arabs used to train it for the chase; but its quarry was cranes and other birds; the more generous eagle being flown at antelopes and various quadrupeds. This species was itself an object of diversion, and made the game of even so small a falcon as the sparrow hawk; which would pursue it with great eagerness, soar above, then fall on it, and fastening with its talons, keep beating it about the head with its wings, till they both fell together to the ground. This Sir John Chardin has seen practised about Tauris.

8. The milvus, or kite, is a native of Europe, Asia, and Africa. This species generally breeds in large forests or woody mountainous countries. Its nest is composed of sticks, lined with several old materials, such as rags, bits of flannel, rope, and paper. It lays two, or at most three, eggs; which, like those of other birds of prey, are much rounded and blunt at the smaller end. They are white, spotted with dirty yellow. Its motion in the air distinguishes it from all other birds, being so smooth and even that it is scarce perceptible. Sometimes it will remain quite motionless for a considerable space; at others glide through the sky without the least apparent action of its wings; from thence deriving the old name of *glead* or *glede*, from the Saxon *glida*. They inhabit the north of Europe, as high as Jarlsberg, in the very south of Norway; but do not extend farther. They quit Sweden in flocks at the approach of winter, and return in spring. Some of them winter about Astrakan, in lat. 46. 30: but the far greater part are supposed to retire into Egypt, being seen in September passing by Constantinople in their way from the north; and again in April returning to Europe, to shun the great heats of the east. They are observed in vast numbers about Cairo, where they are extremely tame, and feed even on dates, probably for want of other food. They also breed there; so that, contrary to the nature of other rapacious birds, they increase and multiply twice in the year; once in the mild winters of Egypt, and a second

time in the summers of the north. It makes its appearance in Greece in the spring; and in the early ages, says Aristophanes, "it governed that country; and men fell on their knees when they were first blessed with the sight of it, because it pronounced the flight of winter, and told them to begin to shear their vernal fleeces." In Britain they are found the whole year. Lord Bacon observes, that when kites fly high, it portend fair and dry weather.

9. The gentilis, or gentil Falcon, inhabits the north of Scotland, and was in high esteem as a bold and spirited bird in the days of falconry. It makes its nest in rocks: it is larger than the goshawk; the head of a light rust colour, with oblong black spots; the whole under side from chin to tail white, tinged with yellow; the back of a brown colour; the tail barred with four or five bars of black, and as many of ash-colour; the very tips of all the tail-feathers white.

10. The subbuteo, or hobby, was used like the kestrel in the humbler kind of falconry; particularly in what was called *daring of larks*: the hawk was cast off; the larks, aware of their most inveterate enemy, were fixed to the ground for fear; by which means they became a ready prey to the fowler, by drawing a net over them. The back of this bird is brown; the nape of the neck white; and the belly pale, with oblong brown spots. It is a bird of passage; but breeds in Britain, and migrates in October.

11. The buteo, or buzzard, is the most common of the hawk kind in England. It breeds in large woods; and usually builds on an old crow's nest, which it enlarges, and lines with wool and other soft materials. It lays two or three eggs, which are sometimes perfectly white, sometimes spotted with yellow. The cock buzzard will hatch and bring up the young if the hen is killed. The young keep company with the old ones for some little time after they quit the nest; which is not usual with other birds of prey, who always drive away their brood as soon as they can fly. This species is very sluggish and inactive, and is much less in motion than other hawks; remaining perched on the same bough for the greatest part of the day, and is found at most times near the same place. It feeds on birds, rabbits, moles, and mice; it will also eat frogs, earthworms, and insects. This bird is subject to some variety in its colour. Some have their breast and belly of a brown colour, and are only marked cross the crow with a large white crescent; but usually the breast is of a yellowish white, spotted with oblong rust-coloured spots, pointing downwards: the back of the head, neck, and coverts of the wings, are of a deep brown, edged with a pale rust-colour: the middle of the back covered only with a thick white down. The tail is barred with black, and ash-colour, and sometimes with ferruginous.

12. The tinnunculus, or kestrel, breeds in the hollows of trees, in the holes of high rocks, towers, and ruined buildings. It feeds on field-mice, small birds, and insects; which it will discover at a great distance. This is the hawk that is so frequently seen in the air fixed in one place; and, as it were, fanning it with its wings; at which time it is watching for its prey. When falconry was in use in Great-Britain, this bird was trained for catching small birds and young partridges. It is easily distinguished from all other hawks

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Falco. by its colours. The crown of the head and the greater part of the tail are of a fine light grey; the back and coverts of the wing of a brick-red, elegantly spotted with black: the whole under side of the bird of a pale rust colour spotted with black.

13. The tuffator, with yellowish wax and legs; the body is of a brownish white colour; and the coverts of the eyes are bony. He has a fleshy lobe between the nostrils; which when angry or terrified, he inflates till his head becomes as big as his whole body. He is a native of Surinam.

14. The cachinnans, or laughing hawk, has yellowish legs and wax, and white eye-brows; the body is variegated with brown and white; and it has a black ring round the top of the head. It makes a laughing kind of noise when it observes any person, and is a native of America.

15. The columbarius, or pigeon-hawk of Catesby, weighs about six ounces. The bill is black at the point, and whitish at the base; the iris of the eye is yellow; the base of the upper mandible is covered with a yellow cere or wax; all the upper part of the body, wings, and tail, are brown. The interior vanes of the quill-feathers have large red spots. The tail is marked with large regular transverse white lines; the throat, breast, and belly, are white, mixed with brown; the small feathers that cover the thighs reach within half an inch of the feet, and are white, with a tincture of red, beset with long spots of brown; the legs and feet are yellow. It inhabits America, from Hudson's Bay as low as South-Carolina. In the last it attains to a larger size. In Hudson's Bay it appears in May on the banks of Severn river, breeds and retires south in autumn. It feeds on small birds; and on the approach of any person, flies in circles, and makes a great shrieking. It forms its nest in a rock, or some hollow tree, with sticks and grafs; and lines it with feathers: and lays from two to four eggs, white, spotted with red. In Carolina it preys on pigeons, and young of the wild turkeys.

16. The fuscatus, or swallow-tailed hawk, has a black bill, less hooked than usual with rapacious birds: the eyes are large and black, with a red iris: the head, neck, breast, and belly, are white; the upper part of the back and wings a dark purple; but more dusky towards the lower parts, with a tincture of green. The wings are long in proportion to the body, and, when extended, measure four feet. The tail is dark purple mixed with green, and remarkably forked. This most elegant species inhabits only the southern parts of North America; and that only during summer. Like swallows, they feed chiefly flying; for they are much on wing, and prey on various sorts of insects. They also feed on lizards and serpents; and will kill the largest of the regions it frequents with the utmost ease. They quit North-America before winter, and are supposed to retreat to Peru.

17. Haliaetus, the fishing-hawk of Catesby, or the osprey, weighs three pounds and a quarter; it measures, from one end of the wing to the other, five feet and a half. The bill is black, with a blue cere or wax; the iris of the eye is yellow, and the crown of the head brown, with a mixture of white feathers; from each eye, backwards, runs a brown stripe: the

back, wings, and tail, are of a dark brown; the throat, neck, and belly, white; the legs and feet are rough and scaly, and of a pale blue colour; the talons are black, and nearly of an equal size; the feathers of the thighs are short, and adhere close to them, contrary to others of the hawk kind, which nature seems to have designed for the more easily penetrating the water. Notwithstanding the osprey is so persecuted by the bald eagle, yet it always keeps near its haunts. It is a species of vast quickness of sight; and will see a fish near the surface from a great distance: descend with prodigious rapidity, and carry the prey with an exulting scream high into the air. The eagle hears the note and instantly attacks the osprey; who drops the fish, which the former catches before it can reach the ground or water. The lower parts of the rivers and creeks near the sea in America, abound with these eagles and hawks, where such diverting contests are often seen. It sometimes happens that the osprey perishes in taking its prey; for if it chances to fix its talons in an over-grown fish, it is drawn under water before it can disengage itself, and is drowned.

18. The Iceland falcon (*G. Mag.* 1771, p. 297), or gyrfalco *Lin.* has a strong bill, much hooked, the upper mandible sharply angulated on the lower edges, with a bluish wax: the head is of a very pale rust-colour, streaked downwards with dusky lines: the neck, breast, and belly, are white, marked with cordated spots; the thighs white, crossed with short bars of deep brown: the back and coverts of the wings are dusky, spotted and edged with white; the exterior webs of the primaries dusky mottled with reddish white, the inner barred with white: the feathers of the tail are crossed with 14 or more narrow bars of dusky and white; the dusky bars regularly opposing those of white: the wings, when closed, reach almost to the end of the train: legs are strong and yellow. The length of the wing, from the pinion to the tip is 16 inches. This species is an inhabitant of Iceland, and is the most esteemed of any for the sport of falconry.

19. The fuscus, or Greenland falcon, has dusky irides; lead-coloured wax and feet; brown crown, marked with irregular oblong white spots; whitish forehead, blackish cheeks; the hind part of the head and throat white; breast and belly of a yellowish white, striped downwards with dusky streaks; the back dusky, tinged with blue, the ends of the feathers lightest, and sprinkled over with a few white spots, especially towards the rump; the wings of the same colours, variegated beneath with white and black; the upper part of the tail dusky crossed very faintly with paler bars, the under side whitish. It inhabits all parts of Greenland, from the remotest hills to those which impend over the sea. They are even seen on the islands of ice remote from shore. They retire in the breeding-season to the farthest part of the country, and return in autumn with their young. They breed in the same manner as the cinereous eagle, but in more distant places; and lay from three to five eggs. The tail of the young is black, with great brown spots on the exterior webs. They prey on ptarmigans, auks, and all the small birds of the country. They have frequent disputes with the raven, but seldom come off victors; for

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for the raven will, on being attacked, fling itself on its back; and either by defending itself with its claws, or by calling, with its croaking, numbers of others to its help, oblige the falcon to retire. The Greenlanders use the skin, among others, for their inner garments; the wings for brushes; the feet for amulets: but seldom eat the flesh, unless compelled by hunger.

20. The gyrfalcon (Br. Zool. n° 47.) has a yellow wax; the bill bluish, and greatly hooked: the eye dark blue; the throat of a pure white; the whole body, wings, and tail, of the same colour, most elegantly marked with dusky bars, lines, or spots, leaving the white the far prevailing colour. There are instances, but rare, of its being found entirely white. In some, the whole tail is crossed by remote bars of black or brown; in others, they appear only very faintly on the middle feathers: the feathers of the thighs are very long and unspotted: the legs strong, and of a light blue. Its weight is 45 ounces Troy; length, near two feet; extent, four feet two. This species has the same manners and haunts with the former. It is very frequent in Iceland; is found in Lapmark and Norway; and rarely in the Orkneys and North Britain. In Asia, it dwells in the highest points of the Urallian and other Siberian mountains, and dares the coldest climates throughout the year. It is kept in the latitude of Petersburg, uninjured in the open air during the severest winters.—This species is pre-eminent in courage as well as beauty, and is the terror of other hawks. It was flown at all kinds of fowl, how great soever they were; but its chief game used to be herons and cranes.

The three last species are in high esteem for sport. They are reserved for the kings of Denmark; who send their falconer with two attendants annually into Iceland to purchase them. They are caught by the natives; a certain number of whom in every district are licensed for that purpose. They bring all they take, about midsummer, to Besssted, to meet the royal falconer; and each brings 10 or 12, capped, and perched on a cross pole, which they carry on horseback and rest on the stirrup. The falconer examines the birds, rejects those which are not for his purpose, and gives the seller a written certificate of the qualities of each, which intitles him to receive from the king's receiver general seventeen rixdollars for the purest white falcon (n° 20.), ten for n° 19. or those which are least white; and seven for n° 18. This brings into the island between 2000 and 3000 rixdollars annually. They are taken in the following manner:—Two posts are fastened in the ground, not remote from their haunts. To one is tied a ptarmigan, a pigeon, a cock or hen, fastened to a cord that it may have means of fluttering, and so attract the attention of the falcon. On the other post is placed a net, distended on a hoop, about six feet in diameter. Through this post is introduced a string, above 100 yards long, which is fastened to the net, in order to pull it down; and another is fastened to the upper part of the hoop, and goes through the post to which the bait is tied. As soon as the falcon sees the fowl flutter on the ground, he takes a few circles in the air, to see if there is any danger, then darts on its prey with such violence as to strike off the head, as nicely as if it was done with a razor. He then usually rises again, and takes another circle,

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to explore the place a second time: after which it makes another stoop; when, at the instant of its descending, the man pulls the dead bird under the net; and, by means of the other cord, covers the falcon with the net at the moment it has seized the prey; the person lying concealed behind some stones, or else lies flat on his belly, to elude the sight of the falcon. As soon as one is caught, it is taken gently out of the net, for fear of breaking any of the feathers of the wings or tail; and a cap is placed over its eyes. If any of the tail-feathers are injured, the falconers have the art of grafting others; which sometimes has occasioned a needless multiplication of species.

The Iceland falcons are in the highest esteem. They will last 10 or 12 years; whereas those of Norway, and other countries, seldom are fit for sport after two or three years use. Yet the Norwegian hawks were in old times in great repute in Britain, and even thought bribes worthy of a king. Geoffroy Le Pierre, chief justiciary, gave two good Norway hawks to King John, that Walter Le Madina might have leave to export 100 weight of cheese. John the son of Ordgar, gave a Norway hawk to have the king's request to the king of Norway, to let him have his brother's chattels; and Ralf Havoc fined to King Stephen in two girfals (gyrfalcons) and two Norway hawks, that he might have the same acquittance that his father had.

21. The aviporus, with black wax, yellow legs, half naked, the head of an ash colour, and having an ash-coloured stripe on the tail, which is white at the end. It is the honey-buzzard of Ray, and had its name from the combs of wasps being found in its nest. It is a native of Europe, and feeds on mice, lizards, frogs, bees, &c. It runs very swiftly, like a hen.

22. The æuginosus, or moor-buzzard, with greenish wax, a greyish body, the top of the head, nape of the neck, and legs, yellowish; is a native of Europe, and frequents moors, marshy places, and heaths: it never soars like other hawks; but commonly sits on the ground or on small bushes. It makes its nest in the midst of a tuft of grass or rushes. It is a very fierce and voracious bird; and is a great destroyer of rabbits, young wild-ducks, and other water-fowl. It preys, like the osprey, on fish.

23. The palumbarius with black wax edged with yellow; yellow legs, a brown body, the prime feathers of the tail marked with pale streaks, and the eye-brows white. It is the gohawk of Ray; and was formerly in high esteem among falconers, being flown at cranes, geese, pheasants, and partridges. It breeds in Scotland, and builds its nest in trees. It is very destructive to game, and dashes through the woods after its quarry with vast impetuosity; but if it cannot catch the object of its pursuit almost immediately, desists, and perches on a bough till some new game presents itself. This species is common in Muscovy and Siberia. They extend to the river Amur; and are used by the emperor of China in his sporting progresses, attended by his grand falconer, and 1000 of the subordinate. Every bird has a silver plate fastened to its foot, with the name of the falconer who had the charge of it; that in case it should be lost, it might be brought to the proper person; but if he could not be found, the bird is delivered to another officer, called the guardian of lost birds; who keeps it till it is demanded

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manded by the falconer to whom it belonged. That this great officer may the more readily be found among the army of hunters who attend the emperor, he erects a standard in the most conspicuous place.

24. The nifus, or sparrow-hawk, with green wax, yellow legs, a white belly undulated with grey, and the tail marked with blackish belts. This is the most pernicious hawk we have; and makes great havoc among pigeons as well as partridges. It builds in hollow trees, in old nests of crows, large ruins, and high rocks: it lays four white eggs, encircled near the blunter end with red specks.

25. The minutus, with white wax, yellow legs, and the body white underneath. It is the least hawk of Briffons, being about the size of a thrush; and is found on the island Melita.

There are near 100 other species distinguished by ornithologists. Among these are two described by Mr Bruce; one of which deserves particular notice here, as being not only the largest of the eagle kind, but, in our author's opinion, the largest bird that flies. He calls it the *golden eagle*; by the natives it is vulgarly called *abon duhn*, or *father long-beard*. It is not an object of any chase, nor stood in need of any stratagem to bring it within reach. Upon the highest top of the mountain Lamalmon, while Mr Bruce's servants were refreshing themselves from that toilsome rugged ascent, and enjoying the pleasure of a most delightful climate, eating their dinner in the outer air with several large dishes of boiled goats flesh before them, this eagle suddenly made its appearance; he did not stoop rapidly from a height, but came flying slowly along the ground; and sat down close to the meat within the ring the men had made round it. A great shout, or rather cry of distress, which they raised, made the bird stand for a minute as if to recollect himself, while the servants ran for their lances and shields. His attention was fully fixed upon the flesh. He put his foot into the pan where was a large piece in water prepared for boiling; but finding the smart which he had not expected, he withdrew it, and forsook the piece which he held. There were two large pieces, a leg and a shoulder, lying upon a wooden platter; into these he trussed both his claws and carried them off; skipping slowly along the ground as he had come, till he disappeared behind a cliff. But being observed at his departure to look wistfully at the large piece which remained in the warm water, it was concluded that he would soon return: in expectation of which Mr Bruce loaded a rifle-gun with ball, and sat down close to the platter by the meat. It was not many minutes before he came, and a prodigious shout was raised by the attendants, "He is coming, he is coming!" enough to have discouraged a less courageous animal. Whether it was not quite so hungry as at the first visit, or suspected something from Mr Bruce's appearance, it made a small turn, and sat down about ten yards from him, the pan with the meat being between them. In this situation Mr Bruce fired, and shot him with the ball through the middle of his body about two inches below the wing, so that he lay down upon the grass without a single flutter. Upon laying hold of his monstrous carcase, our author was not a little surprised at seeing his hands covered and tinged with yellow powder or dust. Upon turning him upon his belly, and examining the feathers of his back, they produced a brown dust, the colour

of the feathers there. This dust was not in small quantities; for upon striking his breast, the yellow powder flew in fully greater quantity than from a hair-dresser's powder puff. The feathers of the belly and breast, which are of a gold colour, did not appear to have any thing extraordinary in their formation, but the large feathers in the shoulder and wings seemed apparently to be fine tubes, which upon pressure scattered this dust upon the finer part of the feather, but this was brown, the colour of the feathers of the back. Upon the side of the wing, the ribs, or hard part of the feather, seemed to be bare as if worn, or, in our author's opinion, were rather renewing themselves, having before failed in their function. What is the reason of this extraordinary provision of nature, our author does not pretend to determine. But as it is an unusual one, it is probably meant, he thinks, for a defence against the climate in favour of those birds which live in those almost inaccessible heights of a country doomed even in its lower parts to several months of excessive rain. According to Mr Bruce's description, this bird, from wing to wing, was 8 feet 4 inches; from the tip of his tail to the point of his beak when dead, 4 feet 7 inches. He was remarkably short in the legs, being only four inches from the joining of the foot to where the leg joins the thigh, and from the joint of the thigh to the joining of his body six inches. The thickness of his thigh was little less than four inches; it was extremely muscular, and covered with flesh. His middle claw was about two inches and a half long, not very sharp at the point, but extremely strong. From the root of the bill to the point was three inches and a quarter, and one inch and three quarters in breadth at the root. A forked brush of strong hair, divided at the point into two, proceeded from the cavity of his lower jaw at the beginning of his throat. His eye was remarkably small in proportion to his bulk, the aperture being scarcely half an inch. The crown of his head was bare or bald, as was also the front where the bill and skull joined.

FALCON, or FAUCON, a bird of prey of the hawk kind, superior to all others for courage, docility, gentleness, and nobleness of nature*. Several authors take the name *falcon* to have been occasioned by its crooked talons or pounces, which resemble a falx or sickle. Giraldus derives it a *falcano*, because it flies in a curve.

The falcon, or falcon gentle, is both for the fist and for the lure. In the choice, take one that has wide nostrils, high and large eye-lids, a large black eye; a round head, somewhat full on the top; barb feathers on the clap of the beaks, which should be short, thick, and of an azure colour; the breast large, round, and fleshy; and the thighs, legs, and feet, large and strong; with the fear of the foot soft and bluish: the pounces should be black, with wings long and crossing the train which should be short and very pliable.

The name *falcon* is restrained to the female; for the male is much smaller, weaker, and less courageous, than the female; and therefore is denominated *tassel*, or *tireolet*. The falcon is excellent at the river, brook, and even field; and flies chiefly at a larger game, as wild-goose, kite, crow, heron, crane, pyc, shoveler, &c. For further particulars, see FALCONRY, HAWK, and HAWKING.

The custom of carrying a falcon extended to many coun-

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Falcon.* See Fal-
co.

Falconer, countries, and was esteemed a distinction of a man of rank. The Welsh had a saying, that you may know a gentleman by his hawk, hore, and grehound. In fact, a person of rank seldom went without one on his hand. Harold, afterwards king of England, is painted going on a most important embassy, with a hawk on his hand and a dog under his arm. Henry VI. is represented at his nuptials, attended by a nobleman and his falcon. Even the ladies were not without them in earlier times; for in an ancient sculpture in the church of Milton Abbas, in Dorsetshire, appears the consort of king Athelstan with a falcon on her royal fist tearing a bird.

FALCONER, a person who brings up, tames, and makes, that is, tutors and manages, birds of prey; as falcons, hawks, &c. See **FALCONRY**.

The grand seignior usually keeps 6000 falconers in his service.—The French king has a grand falconer, which is an office dismembered from that of great hunt, *grand venur*. Historians take notice of this post as early as the year 1250.

A falconer should be well acquainted with the quality and mettle of his hawks, that he may know which of them to fly early and which late. Every night after flying he should give them casting; one while plumage, sometimes pellets of cotton, and at another time physic, as he finds necessary. He ought also every evening to make the place clean under the porch, that by her casting he may know whether she wants scouring upwards or downwards. Nor must he forget to water his hawk every evening, except on such days as she has bathed; after which, at night, she should be put into a warm room, having a candle burning by her, where she is to sit unhooded, if she be not ramage, that she may pick and prune herself.—A falconer should always carry proper medicines into the field, as hawks frequently meet with accidents there. Neither must he forget to take with him any of his hawking implements; and it is necessary he should be skilful in making lures, hoods of all sorts, jesses, bewets, and other furniture. Neither ought he to be without his coping irons, to cope his hawk's beak when overgrown, and to cut her pounces and talons as there shall be occasion: nor should his cauterizing irons be wanting.

FALCONER (William), an ingenious Scots sailor, who, about the year 1762, came up to London with a pretty pathetic poem, called the *Shipwreck*, founded on a disaster of his own experience. The publication of this piece recommended him to the late duke of York; and he would in all probability have been suitably preferred, if a second shipwreck, as may be supposed, had not proved fatal to him, and to many gentlemen of rank and fortune with whom he sailed. In 1770, he went out a volunteer in the *Aurora* frigate sent to carry Messrs Vansittart, Scrafton, and Ford, the supervisors appointed to regulate the English East India settlements; which vessel, after it had touched at the Cape of Good Hope, was never more heard of. Before his departure, he published a very useful *Marine Dictionary*, in 1 vol. 4to.

FALCONRY, the art of training all manner of hawks, but more especially the larger ones called *falcons*, to the exercise of hawking. See **HAWKING**.

When a falcon is taken, she must be feeded in such

a manner, that, as the feeling slackens, she may see what provision lies before her; but care ought to be taken, not to feed her too hard. A falcon or hawk newly taken should have all new furniture, as new jesses of good leather, mailed leashes with buttons at the end, and new bewets. There should also be provided a small round stick, to stroke the hawk; because, the oftener this is done, the sooner and better will she be manned. She must also have two good bells, that she may be found when she scattereth. Her hood should be well fashioned, raised, and embossed against her eyes, deep, and yet straight enough beneath, that it may fasten about her head without hurting her; and her beak and talons must be a little coped, but not so near as to make them bleed.

If it be a soar-falcon which hath already passed the seas, she will indeed be harder to reclaim, but will prove the best of falcons. Her food must be good and warm, and given her twice or thrice a-day, till she be full gorged: the best for this purpose is pigeons, larks, or other live birds; because she must be broken off by degrees from her accustomed feeding. When she is fed, you must hoop and lure, as you do when you call a hawk, that she may know when you intend to give her meat. On this occasion she must be unhooded gently; and after giving her two or three bits, her hood must be put on again, when she is to get two or three bits more. Care must be taken that she be close feeded; and after three or four days, her diet may be lessened: the falconer setting her every night to perch by him, that he may awaken her often in the night. In this manner he must proceed, till he find her to grow tame and gentle; and when she begins to feed eagerly, he may give her a sheep's heart. He may now begin to unhood her in the day-time; but it must be far from company, first giving her a bit or two, then hooding her gently, and giving her as much more. When she is sharp set, he may now unhood her, and give her some meat just against his face and eyes, which will make her less afraid of the countenances of others. She must be borne continually on the fist, till she is properly manned, causing her to feed in company, giving her in the morning, about sun-rise, the wing of a pullet; and in the evening, the foot of a hare or coney, cut off above the joint, flead and laid in water, which being squeezed, is to be given her with the pinnion of a hen's wing. For two or three days give her washed meat, and then plumage in more or less quantity as she is thought to be more or less foul within. After this, being hooded again, she is to get nothing till she has gleaned and cast, when a little hot meat may be given her in company; and, towards evening, she may be allowed to plume a hen's wing in company also. Cleanse the feathers of her casting, if foul and slimy; if she be clean within, give her gentle castings; and when she is reclaimed, manned, and made eager and sharp set, he may venture to feed her on the lure.

However, three things are to be considered before the lure be showed her, 1. That she be bold and familiar in company, and not afraid of dogs and horses. 2. Sharp set and hungry, having regard to the hour of morning and evening, when you would lure her. 3. Clean within, and the lure well garnished with meat on both sides; and when you intend to give her the length of a leash, you must abscond yourself.

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Falisci.

She must also be unhooded, and have a bit or two given her on the lure as she sits on your fist; afterwards take the lure from her, and hide it, that she may not see it, and when she is unfeeling, cast the lure so near her, that she may catch it within the length of her leath, and as soon as she has seized it, use your voice as falconers do, feeding her upon the lure, on the ground, with the heart and warm thigh of a pullet.

Having so lured your falcon, give her but little meat in the evening; and let this luring be so timely, that you may give her plumage, and a juck of a joint next morning on your fist. When she has cast and gleamed, give her a little reaching of warm meat. About noon, tie a creance to her leath; and going into the field, there give her a bit or two upon her lure: then unwind the creance, and draw it after you a good way; and let him who has the bird hold his right hand on the tassel of her hood, ready to unhood her as soon as you begin to lure; to which if she come well, stoop roundly upon it, and hastily seize it, let her cast two or three bits thereon. Then, unseizing and taking her off the lure, hood her and give her to the man again; and, going farther off, lure and feed her as before.

In this manner is the falconer to proceed, luring her every day farther and farther off, till she is accustomed to come freely and eagerly to the lure; after which she may be lured in company, taking care that nothing affright her. When she is used to the lure on foot, she is to be lured on horseback; which may be effected the sooner, by causing horsemen to be about her when she is lured on foot.

When she has grown familiar to this way, let somebody on foot hold the hawk, and he on horseback must call and cast the lure about his head, the holder taking off the hood by the tassel; and if she seize eagerly on the lure without fear of man or horse, then take off the creance, and lure her at a greater distance. And if you would have her love dogs as well as the lure, call dogs when you give her her living or plumage. See the article HAWKING.

FALERII (anc. geog.), a town of Etruria, on the west or right side of the Tiber; Falisci, the people of the town and territory. The territory was famous for its rich pastures; hence the *gramen Faliscum* in authors. Eutropius and Frontinus call the town *Falisci*; which, according to the last, was surnamed *Colonia Junonia*. The Falisci are called *Aequi* by Virgil; because they afforded supplemental laws to the 12 tables, (Servius). Here they made an excellent sausage, called *Venter Faliscus* (Martial).

When the Falisci were besieged by Camillus, a school-master went out of the gates of the city with his pupils, and proposed to betray them into the hands of the Roman enemy, that by such a possession he might easily oblige the place to surrender. Camillus heard the proposal with indignation, and ordered the man to be stripped naked, and whipped back to the town by those whom his perfidy wished to betray. This instance of generosity operated upon the people so powerfully that they surrendered to the Romans.

FALERNUS, *Mons Massicus* so called (Martial); Falernus ager, a district at the foot of Mount Massicus in Campania; famous for its generous wines, (Horace, Pliny). Now called *Monte Massico*.

FALISCI. See FALERII.

FALKIA, in botany: a genus of the trigynia order, belonging to the hexandria class of plants. The calyx is monophyllous; the corolla monopetalous; the seeds four in number.

FALKIRK, a town of Stirlingshire in Scotland, situated in W. Long. 3. 48. N. Lat. 56. 20. It is a large ill-built place, and is supported by great fairs for black cattle from the Highlands, it being computed that 24,000 head are annually sold there. A great deal of money is also got here by the carriage of goods landed at Carron wharf to Glasgow. This town is remarkable for a battle fought in its neighbourhood between Edward I. of England, and the Scots commanded by the Steward of Scotland, Cummin of Badenoch, and Sir William Wallace. The latter had been invested with the supreme command; but perceiving that this gave umbrage to the nobility, he resigned his power into the hands of the nobleman above-mentioned, reserving to himself only the command of a small body who refused to follow another leader. The Scots generals placed their pikemen along the front, and lined the intervals between the three bodies of which their army was composed, with archers; and dreading the great superiority of the English cavalry, endeavoured to secure their front by pallisadoes tied together with ropes. The battle was fought on the 22d of July 1298. The king of England divided his army likewise into three bodies, and by the superiority of his archers, defeated the Scots with great slaughter. Wallace alone preserved entire the troops he commanded; and retiring behind the Carron, marched leisurely along the banks of that river, which protected him from the enemy. In this battle fell John de Graham, a gentleman much celebrated for his valour, and styled the *right hand* of the gallant Wallace. His epitaph is still to be seen on a plain stone in the church yard of Falkirk. On the 18th of January 1746, a battle was fought here between the king's forces commanded by general Hawley, and the Highlanders headed by Charles Stuart. The former was seized with a panic, and fled; but Colonel Husk with two regiments, who kept their ground, prevented the Highlanders from pursuing their victory. Extensive ruins are perceived in the neighbourhood of this town, supposed by some antiquarians to have been the capital of the Pictish government; but others believe them to be the remains of some Roman stations.

FALKLAND, a small town of Fifeshire in Scotland, made a royal burgh by James II. in 1458. Here stood one of the seats of the Macduffs earls of Fife. On the attainder of Munro Stewart, the 17th earl, it became forfeited to the crown in 1424. James V. who grew very fond of the place, enlarged and improved it. The remains evince its former magnificence and elegance, and the fine taste of the princely architect. The gateway is placed between two fine round towers; on the right-hand joins the chapel whose roof is of wood, handsomely gilt and painted, but in a most ruinous condition. Beneath are several apartments. The front next to the court was beautifully adorned with statues, heads in bas-relief, and elegant columns not reducible to any order, but of fine proportion, with capitals approaching the Ionic scroll. Beneath some of these pillars was inscribed I. R. M. G. 1537: or *Jacobus Rex, Maria de Guise*.—This place was also

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Falkland.

Falkland,
Fall

a favourite residence of James VI. on account of the fine park and plenty of deer. The east side was accidentally burnt in the time of Charles II. and the park ruined during Cromwell's usurpation; when the fine oaks were cut down in order to build the fort at Perth. — This place gives title of viscount to the English family of Carey; Sir Henry Carey being so created by James VI. 1620. His son was the celebrated Lucius, who sacrificed his life in a fit of loyal despair at the battle of Newbury, and from whom Lucius Charles the present viscount is the fifth in lineal descent.

FALKLAND (Lord). See CAREY.

FALL, the descent of a heavy body towards the centre of the earth. It is also the name of a measure of length used in Scotland, containing six ells.

FALL of Man, in sacred history, that terrible event by which sin and death were introduced into the world. See ADAM, and ANTEDILUVIANS, and *Original Sin*. The account which Moses gives of this transaction is extremely brief and concise. The serpent, he informs us, being more subtle than any beast of the field, asked the woman, whether it was true that God had not granted her and her husband leave to eat of every tree in the garden? she answered, that God had allowed them to eat of all, except only the fruit of the tree in the midst of the garden; which he commanded they should not taste, nor so much as touch, lest they should die. The serpent replied, that they should not die; for God knew the virtue of the tree; and that, so soon as they eat of it, their eyes would be opened, and they would become like gods, knowing good and evil. Eve, seeing the fruit tempting to the view, took of the fruit and ate; and gave also to her husband of it, and he did eat. Immediately the eyes of both were opened; when perceiving they were naked, they sewed fig-leaves together, and made themselves aprons. Adam and Eve, hearing the voice of God walking in the garden in the cool of the day, hid themselves among the trees; but, on God's calling for Adam, he excused himself for not appearing, because he was naked. God demanded of him, who it was that told him he was naked; and whether he had disobeyed his command, in eating the forbidden fruit? Adam confessed that the woman had offered him the fruit, and he had tasted it. She, being examined likewise, acknowledged what she had done; but said, the serpent had seduced and deceived her. God then proceeded to judgment; he first cursed the serpent above all beasts, and condemned him to go on his belly, and eat the dust; adding, that he would put enmity between him and the woman, and their offspring; that the seed of the woman should bruise the serpent's head, who should bruise the other's heel. The woman was subjected to the pains of childbirth, as well as to the dominion of her husband; and as to the man, God cursed the ground for his sake, declaring, that it should bring forth thorns and thistles, and he should earn his bread by the sweat of his brow, till he returned to the dust, from whence he was taken. At last, having clothed them both with skins, he turned them out of the garden, lest they should take of the tree of life, and eat, and live for ever: then, to prevent any attempt to return to their former habitation, he placed cherubims at the east of the garden, and a flaming sword,

which turned every way, to guard the passage to the tree of life.

This concise account being, at first view, incumbered with some difficulties, several learned and pious men have been inclined to believe the whole ought to be taken in an allegorical sense, and not according to the strictness of the letter: they alledge, that the ancients, and particularly the eastern nations, had two different ways of delivering their divinity and philosophy, one popular, and the other mysterious; that the scripture uses both occasionally; sometimes accommodating itself to the capacities of the people, and at other times to the real but more veiled truth; and that, to obviate the many difficulties which occur in the literal history of this sad catastrophe, the safest way is to understand it as a parabolical story, under which the real circumstances are disguised and concealed, as a mystery not fit to be more explicitly declared.

Though it cannot be denied that some of the ancient philosophers affected such an allegorical way of writing, to conceal their notions from the vulgar, and keep their learning within the bounds of their own school; yet it is apparent Moses had no such design; and as he pretends only to relate matters of fact, just as they happened, without art or disguise, it cannot be supposed but that this history of the fall is to be taken in a literal sense, as well as the rest of his writings. It is generally agreed, that the serpent which tempted Eve was the Devil, who envying the privileges of man in his innocence, tempted him, and was the cause of his forfeiting all those advantages which he had received from God at his creation; and that to this end he assumed the form of a serpent. These interpretations are supported by many passages of Scripture, where the Devil is called the *serpent*, and the *old serpent*, (See John viii. 44. 2 Cor. xi. 3. and Rev. xii. 9.) Some believe that the serpent had then the use of speech, and conversed familiarly with the woman, without her conceiving any distrust of him; and that God, to punish the malice with which he had abused Eve, deprived him of the use of speech. Others maintain, that a real serpent having eaten of the forbidden fruit, Eve from thence concluded, that she too might eat of it without danger; that in effect she did eat of it, and incurred the displeasure of God by her disobedience. This, say these last authors, is the plain matter of fact which Moses would relate under the allegorical representation of the serpent conversing with Eve.

The opinion of such as believe this was not a real serpent, but only the Devil under that name, is no less liable to exception than any of the rest. For though the Devil is frequently styled in Scripture the *serpent*, and the *old serpent*, yet why he should be called the *most subtle beast of the field*, we cannot conceive; neither will the punishment inflicted on the serpent suffer us to doubt, but that a serpent's body at least was employed in the transaction.

The nature of the forbidden fruit is another circumstance in this relation that has occasioned no less variety of conjectures. The Rabbins believe it was the vine; others that it was wheat; and others, from the circumstance of Adam and Eve's covering themselves with fig-leaves immediately after their transgression, tell us, that this fruit must have been the fig; some think

Fall.

Fallacy

Fallopian.

think it was the cherry; and the generality of the Latins will have it to be the apple.

Those who admire allegorical interpretations, will have the forbidden fruit to have been no other than the sensual act of generation, for which the punishment inflicted on the woman was the pain of child-bearing. But this opinion has not the least foundation in the words of Moses, especially if we consider that Adam knew not his wife till after their expulsion out of Paradise.

Many have been the suppositions and conjectures upon this subject in general; and some have so far indulged their fancy in the circumstances of the fall, that they have perverted the whole narration of Moses into a fable full of the most shameful extravagancies.

FALLACY, a deception, fraud, or false appearance.

The Epicureans deny that there is any such thing as a fallacy of the senses; for, according to them, all our sensations and perceptions, both of sense and phantasy, are true; whence they make sense the primary criterion of truth.

The Cartesians, on the other hand, maintain, that we should suspect as false, or at most as dubious, every thing that presents itself to us by means only of the external senses, because they frequently deceive us. They add, that our senses, as being fallacious, were never given us by nature for the discovery of truth, or the contemplation of the principles of things; but only for pointing out to us what things are convenient or hurtful to our bodies.

The Peripatetics keep a middle course. They say, that if a sensible object be taken in its common or general view, the sense cannot be deceived about it; but that if the object be taken under its specific view, the sense may be mistaken about it, from the want of the dispositions necessary to a just sensation, as a disorder in the organ, or any thing uncommon in the medium: thus, in some disorders of the eye, all objects appear yellow; a stick in water appears broken or crooked, &c.

FALLING-SICKNESS, or **EPILEPSY**. See **MEDICINE-Index**.

FALLING-STARS. See **STAR**.

FALLOPIAN TUBES, in anatomy, two ducts arising from the womb, one on each side of the fundus, and thence extended to the ovaries, having a considerable share in conception. They are called *tubæ*, from their form, which bears some resemblance to a trumpet; and their denomination, *Fallopianæ*, they take from Gabriel Fallopius, mentioned in the next article. See **ANATOMY**, p. 740. col. 2.

FALLOPIUS (Gabriel), a most celebrated physician and anatomist, was born at Modena in Italy, in the year 1523, and descended of a noble family. He made several discoveries in anatomy, one of which was that of the tubes, called from him the *Fallopian tubes*. He travelled through the greatest part of Europe, and obtained the character of being one of the ablest physicians of his age. He was made professor of anatomy at Pisa in the year 1548, and at Padua in the year 1551: here he died in 1562, aged 39. His writings, which are numerous, were first printed separately, and afterwards collected under the title of "*Opera genuina omnia, tam practica quam theoretica, in tres to-*

mos distributa." They were printed at Venice in 1585, and in 1606; at Francfort in 1600, *cum operum appendice*; and in 1606, in folio.

FALLOW, a pale red-colour, like that of brick half-burnt; such is that of a fallow-deer.

FALLOW-Field, or **Fallow-ground**; land laid up, or that has been untilled for a considerable time.

FALLOWING of LAND, a particular method of improving land. See **AGRICULTURE**, n^o 14, 15, 185.

FALMOUTH, a port-town of Cornwall in England, situated in W. Long. 5. 30. N. Lat. 50. 15. on a fine bay of the English channel. It is the richest and most trading town of the county, and larger than any three of its boroughs that send members to parliament. It is so commodious a harbour, that ships of the greatest burden come up to its quay. It is guarded by the castle of St Mawes and Pendennis, on a high rock at the entrance; and there is such shelter in the many creeks belonging to it, that the whole royal navy may ride safe here in any wind, it being next to Plymouth and Milford-Haven, the best road for shipping in Great Britain. It is well-built; and its trade is considerably increased since the establishment of the packet-boats here for Spain, Portugal, and the West-Indies, which not only bring vast quantities of gold in specie and in bars, on account of the merchants in London; but the Falmouth merchants trade with the Portuguese in ships of their own, and they have a great share also in the gainful pilchard trade. The custom-house for most of the Cornish towns, as well as the head collector, is settled here, where the duties, including those of the other ports, are very considerable. It is a corporation, governed by a mayor and aldermen. Here is a market on Thursday, and fairs July 27, and October 30.

FALSE, in general, something contrary to truth, or not what it ought to be: thus we say a false action, false weights, false claim, &c.

FALSE Action, if brought against one whereby he is cast into prison, and dies pending the suit, the law gives no remedy in this case, because the truth or falsehood of the matter cannot appear before it is tried; and if the plaintiff is barred, or non-suited at common law, regularly all the punishment is amercement.

FALSE Imprisonment, is a trespass committed against a person, by arresting and imprisoning him without just cause, contrary to law; or where a man is unlawfully detained without legal process: and it is also used for a writ which is brought for this trespass. If a person be any way unlawfully detained, it is false imprisonment; and considerable damages are recoverable in those actions.

FALSE News, spreading of, in order to make discord between the king and nobility, or concerning any great man of the realm, is punishable by common law with fine and imprisonment; which is confirmed by statutes Westm. 1. 3 Edw. I. cap. 34. 2 Ric. II. stat. 1. cap. 5. & 12 Ric. II. cap. 11.

FALSE Oath. See **PERJURY**.

FALSE Prophecy. See **PROPHECY**.

FALSE Quarter, in farriery. See **QUARTERS**.

FALSE Bay, a bay lying to the eastward of the Cape of Good Hope; frequented by vessels during the prevalence of the north-westerly winds, which begin to exert their influence in May, and render it dangerous to remain in Table Bay. It is terminated to the eastward

Fallow

False.

Falsi
Fama.

ward by False Cape, and to the westward by the Cape of Good Hope. It is 18 miles wide at its entrance, and the two capes bear due east and west from each other.

FALSI CRIMEN, in the civil law, is fraudulent subornation or concealment, with design to darken or hide the truth, and make things appear otherwise than they are. The *crimen falsi* is committed, 1. By words, as when a witness swears falsely. 2. By writing, as when a man antedates a contract, or the like. 3. By deed, as when he sells by false weights and measures.

FALSIFY, in law, is used for proving any thing to be false. Hence we find

FALSIFYING a record, for showing it to be erroneous. Thus lawyers teach, that a person purchasing land of another, who is afterwards outlawed of felony, &c. may falsify the record, not only as to the time wherein the felony is supposed to have been committed, but also as to the point of the offence. But where a man is found guilty by verdict, a purchaser cannot falsify as to the offence; though he may for the time where the party is found guilty generally in the indictment, because the time is not material upon evidence.

FALSTAFF. See **FASTOLFF**.

FALX, in anatomy, a part of the dura mater, descending between the two hemispheres of the brain, and separating the fore-part from the hinder. It is called *falx*. i. e. "sickle," because of its curvature, occasioned by the convexity of the brain. It divides the brain as low as the corpus callosum.

FAMA CLAMOSA, in the judicial procedure of the church of Scotland, a ground of action before a presbytery against one of its members, independant of any regular complaint by a particular accuser. See **PRESBYTERY**.

Any person who is of a good character, may give to the presbytery a complaint against one of their members; but the presbytery is not to proceed to the citation of the person accused, until the accuser under his hand gives in the complaint, with some account of its probability, and undertakes to make out the libel, under the pain of being considered as a slanderer. When such an accusation is brought before them, they are obliged candidly to examine the affair. But, besides this, the presbytery considers itself obliged to proceed against any of its members, if a fama clamosa of the scandal is so great that they cannot be vindicated unless they begin the process. This they can do without any particular accuser, after they have inquired into the rise, occasion, and authors, of this report. It is a maxim in the kirk of Scotland, that religion must suffer if the scandalous or immoral actions of a minister are not corrected. And wherever a minister is reputed guilty of any immorality (although before the most popular preacher in the kingdom), none almost will attend upon his ministry. Therefore the presbytery, for the sake of religion, is obliged to proceed against a minister in case of a fama clamosa. This, however is generally done with great tenderness. After they have considered the report raised against him, then they order him to be cited, draw out a full copy of what is reported, with a list of the witnesses names to be led for proving this allegation. He is now to be formally summoned to appear before them; and he

has warning given him, at least ten days before the time of his compearance, to give in his answers to what is termed the *libel*; and the names of the witnesses ought also to be sent him. If at the time appointed the minister appear, the libel is to be read to him, and his answers are also to be read. If the libel be found relevant, then the presbytery is to endeavour to bring him to a confession. If the matter confessed be of a scandalous nature, such as uncleanness, the presbytery generally depose him from his office, and appoint him in due time to appear before the congregation where the scandal was given, and to make public confession of his crime and repentance. If a minister absent himself by leaving the place, and be contumacious, without making any relevant excuse, a new citation is given him, and intimation is made at his own church when the congregation is met, that he is to be holden as confessed, since he refused to appear before them; and accordingly he is deposed from his office.

FAME, a heathen goddess, celebrated chiefly by the poets. She is feigned to have been the last of the race of Titans produced by the earth, to have her palace in the air, and to have a vast number of eyes, ears, and tongues. She is mentioned by Hesiod, and particularly described by Ovid and Virgil.

FAMES-CANINA, the same with **BULIMY**.

FAMIA, or **AFAMIA**, the modern name of one of the ancient Apameas. See **APAMEA**.

FAMILIARS of the **INQUISITION**, persons who assist in apprehending such as are accused, and carrying them to prison. They are assistants to the inquisitor, and called *familiars*, because they belong to his family. In some provinces of Italy they are called *cross-bearers*, and in others the *scholars of St Peter the martyr*; and they wore a cross before them on the outside garment. They are properly bailiffs of the inquisition; and the vile office is esteemed so honourable, that noblemen in the kingdom of Portugal have been ambitious of belonging to it. Nor is this surprising, when it is considered that Innocent III. granted very large indulgences and privileges to these familiars; and that the same plenary indulgence is granted by the pope to every single exercise of this office, as was granted by the Lateran council to those who succoured the Holy Land. When several persons are to be taken up at the same time, these familiars are commanded to order matters that they may know nothing of one another's being apprehended; and it is related, that a father and his three sons, and three daughters, who lived together in the same house, were carried prisoners to the inquisition without knowing any thing of one another's being there till seven years afterwards, when they that were alive were released by an act of faith.

FAMILY, denotes the persons that live together in one house, under the direction of one head or chief manager. It also signifies the kindred or lineage of a person; and is used by old writers for a hide or portion of land sufficient to maintain one family. See **HIDE**.

FAMILY, in natural history, a term used by authors to express any order of animals, or other natural productions of the same class. See **CLASS** and **ORDER**.

Fame
Family.

Famine,
Fan.

FAMINE, dearth, or scarcity of food. For preservatives against hunger in times of famine, see the article **HUNGER**.

FAN, a machine used to raise wind, and cool the air by agitating it.

That the use of the fan was known to the ancients is very evident from what Terence says,

Gape hoc flabellum, et ventulum huic sic facito;

and from Ovid, *Art. Amand.* i. 161.

Profuit et tenues ventos movisse flabello.

The fans of the ancients were made of different materials; but the most elegant were composed of peacock's feathers, or perhaps painted, so as to represent a peacock's tail.

The custom which now prevails among the ladies of wearing fans, was borrowed from the east, where the hot climate renders the use of fans and umbrellas almost indispensable.

In the east they chiefly use large fans made of feathers, to keep off the sun and the flies. In Italy and Spain they have a large sort of square fans, suspended in the middle of their apartments, and particularly over the tables; these, by a motion at first given them, which they retain a long time on account of their perpendicular suspension, help to cool the air and drive off flies.

In the Greek church, a fan is put into the hands of the deacons in the ceremony of their ordination, in allusion to a part of the deacon's office in that church, which is to keep the flies off the priests during the celebration of the sacrament.

What is called a *fan* amongst us and throughout the chief parts of Europe, is a thin skin, or piece of paper, taffety, or other light stuff, cut semicircularly, and mounted on several little sticks of wood, ivory, tortoise-shell, or the like. If the paper be single, the sticks of the mounting are pasted on the least ornamental side: if double, the sticks are placed betwixt them. Before they proceed to place the sticks, which they call *mounting the fan*, the paper is to be plaited in such manner, as that the plaits may be alternately inward and outward.

It is in the middle of each plait, which is usually about half an inch broad, that the sticks are to be pasted; and these again are to be all joined and rivetted together at the other end; they are very thin, and scarce exceed one-third of an inch in breadth; and where they are pasted to the paper, are still narrower, continuing thus to the extremity of the paper. The two outer ones are bigger and stronger than the others.

The number of sticks rarely exceeds 22. The sticks are usually provided by the cabinet-makers or toy-men; the fan-painters plait the papers, paint, and mount them.

The common painting is either in colours or gold-leaf, applied on a silvered ground, both prepared by the gold-beaters. Sometimes they paint on a gold ground, but it is rarely; true gold being too dear, and false too paltry. To apply the silver leaves on the paper, they use a composition, which they pretend is a great secret, but which appears to be no other than gum Arabic, sugar-candy, and a little honey melted in common water, and mixed with a little brandy. This composition is laid on with a sponge; then lay-

ing the silver leaves thereon, and pressing them gently down with a linen ball stuffed with cotton, they catch hold, and adhere together. When, instead of silver, gold ground is laid, the same method is observed. The ground being well dried, a number of the papers are well beaten together on a block, and by this means the silver or gold get a lustre as if they had been burnished.

FAN is also an instrument to winnow corn.—The machine used for this purpose by the ancients seems to have been of a form similar to ours. The fan, which Virgil calls *mystica vannus Iacchi*, was used at initiations into the mysteries of the ancients: For as the persons who were initiated into any of mysteries, were to be particularly good, this instrument, which separates the wheat from the chaff, was the fittest emblem that could be of setting apart the good and virtuous from the vicious and useless part of mankind. It is figuratively applied in a similar manner in Luke iii. 17.

FANATICS, wild, enthusiastic, visionary persons, who pretend to revelation and inspiration.

The ancients called those *fanatici* who passed their time in temples (*fana*), and being often seized with a kind of enthusiasm, as if inspired by the divinity, showed wild and antic gestures. Prudentius represents them as cutting and flashing their arms with knives. Shaking the head was also common among the fanatics; for Lampridius informs us, that the emperor Heliogabulus was arrived to that pitch of madness, as to shake his head with the gashed fanatics. Hence the word was applied among us to the Anabaptists, Quakers, &c. at their first rise, and is now an epithet given to the modern prophets, muggle-tonians, &c.

FANCY, or imagination. See **IMAGINATION**.

FANIONS, in the military art, small flags carried along with the baggage.

FANSHAW (Sir Richard), famous for his embassies and writings, was the tenth and youngest son of Sir Henry Fanshaw of Ware Park in Hertfordshire, where it is supposed he was born about the year 1607. He distinguished himself so early by his abilities, that in 1635 he was taken into government-employments by King Charles I. and sent resident to the court of Spain; whence being recalled in the beginning of the troubles in 1641, he adhered to the royal interest, and was employed in several important matters of state. During his vacant hours he wrote divers poems, and made several translations. At the restoration it was expected he would have been made one of the secretaries of state: however, he was made master of the requests; a station in those times of considerable profit. Afterwards, on account of his skill in the Latin language, he was made secretary for that tongue. In 1661, he was sent envoy to the king of Portugal. In 1662, he was again sent to that court with the title of *ambassador*, and negotiated the marriage of his master king Charles II. with the infanta Donna Catherina. Upon his return he was made one of the privy-council. In 1664, he was sent ambassador to both the courts of Spain and Portugal; at which time the foundation of peace betwixt those crowns and England was laid by him. His conduct during his former employments in those courts gained him such high esteem there, that his reception was magnificent, exceeding all that were before, which those kings declared was

Fan
||
Fanshaw.

Fantasia
||
Fare.

not to be a precedent to succeeding ambassadors. He died at Madrid in 1666, on the very day he had fixed for setting out on his return to England. Besides some original poems, and other translations, he published a translation of Bathista Guarini's *Pastor Fido*, and another of the *Lusiad* of Camoen's. Among his posthumous publications are, "Letters during his embassies in Spain and Portugal; with his life prefixed."

FANTASIA, in the Italian music, signifies *fancy*; and is used for a composition, wherein the composer ties himself to no particular time, but ranges according as his fancy leads, amidst various movements, different airs, &c. This is otherwise called the *capricious style*: before sonatas were used, there were many of this kind, some of which remain even now.

FANUM, among the Romans, a temple or place consecrated to some deity. The deified men and women among the heathens had likewise their *fana*; even the great philosopher Cicero erected one to his daughter Tullia.

FANUM *Vacuna*, (anc. geog.), a village of the Sabines, situated between Cures and Mandela; where stood the temple of Vacuna, goddess of the idle or unemployed, in an old decayed state; and hence the epithet *putre*, used by Horace. Now called *Vocone* in the Ecclesiastic State.

FARANDMAN, a traveller, or merchant stranger, to whom, by the laws of Scotland, justice ought to be done with all expedition, that his business or journey be not hindered.

FARCE, was originally a droll, petty show, or entertainment, exhibited by charlatans, and their buffoons, in the open street to gather the crowd together. —The word is French, and signifies literally, "force-meat or stuffing." It was applied on this occasion, no doubt, on account of the variety of jests, gibes, tricks, &c. wherewith the entertainment was interlarded. Some authors derive farce from the Latin *facetia*; others from the Celtic *farce*, "Mockery;" others from the Latin *farcire*, "to stuff."

At present it is removed from the street to the theatre; and instead of being performed by merry-andrews to amuse the rabble, is acted by comedians, and becomes the entertainment of a polite audience. Poets have reformed the wildness of the primitive farces, and brought them to the taste and manner of comedy. The difference between the two on our stage is, that comedy keeps to nature and probability, and therefore is confined to certain laws prescribed by ancient critics; whereas farce disallows of all laws, or rather sets them aside on occasion. Its end is purely to make merry; and it sticks at nothing which may contribute thereto, however wild and extravagant. Hence the dialogue is usually low, the persons of inferior rank, the fable or action trivial or ridiculous, and nature and truth every where heightened and exaggerated to afford the more palpable ridicule.

FARCIN, or FARCY, a disease in horses, and sometimes in oxen, &c. somewhat of the nature of a scabies or mange. See FARRIERY, sect. xxiv.

FARDING-DEAL, the fourth part of an acre of land. See ACRE.

FARE, most commonly signifies the money paid for a voyage, or passage by water; but, in London, it

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is what persons pay for being conveyed from one part of the town to another in a coach or chair.

FAREWELL-CAPE, the most southerly promontory of Greenland, in W. Long. 50°, and N. Lat. 60°.

FARIN, or FARM. See FARM.

FARINA, a Latin term signifying meal, or the flour of corn. See CORN.

FARINA *Fæcundans*, among botanists, the supposed impregnating meal or dust on the apices or antheræ of flowers. See POLLEN.

The manner of gathering the farina of plants for microscopical observations is this: Gather the flowers in the midst of a dry sunshiny day when the dew is perfectly off, then gently shake off the farina, or lightly brush it off with a soft hair-pencil, upon a piece of white paper; then take a single talc or isinglass between the nippers, and, breathing on it, apply it instantly to the farina, and the moisture of the breath will make that light powder stick to it. If too great a quantity be found adhering to the talc, blow a little of it off; and, if there is too little, breathe upon it again, and take up more. When this is done, put the talc into the hole of a slider, and, applying it to the microscope, see whether the little grains are laid as you desire; and if they are, cover them up with another talc, and fix the ring; but be careful that the talcs do not press upon the farina in such a manner as to alter its form.

FARLEU, money paid by the tenants in the west of England, in lieu of a heriot. In some manors of Devonshire, farleu is often distinguished to be the best goods, as heriot is the best beast, payable at the death of a tenant.

FARM, FARIN, or *Ferm*, (*Ferma*), in law, signifies a little country messuage or district; containing house and land, with other conveniences; hired, or taken by lease, either in writing, or parole under a certain yearly rent. See LEASE.

This in divers parts is differently termed: in the north, it is a *tack*; in Lancashire, a *fermeholt*; in Essex, a *wike*, &c.

In the corrupted Latin, *firma* signified a place inclosed or shut in: whence, in some provinces, Menage observes, they call *closerie*, or *closure*, what in others they call a *farm*. Add, that we find *locare ad firmam*, to signify to let to *farm*; probably on account of the sure hold the tenant here has in comparison of tenants at will.

Spelman and Skinner, however, choose to derive the word *farm* from the Saxon *fearme*, or *feorme*, that is, *victus*, "provision;" by reason the country people and tenants anciently paid their rents in victuals and other necessities, which were afterwards converted into the payment of a sum of money. Whence a *farm* was originally a place that furnished its landlord with provisions. And among the Normans they still distinguish between farms that pay in kind, *i. e.* provisions, and those which pay in money; calling the former simply *fermes*, and the latter *blanche ferme*, "white farm."

Spelman shows, that the word *firma*, anciently signified not only what we now call a *farm*, but also a feast or entertainment, which the farmer gave the proprietor or landlord, for a certain number of days, and

O

at

Farewell-
Cape
||
Farm.

Farm at a certain rate, for the lands he held of him. Thus *farm* in the laws of king Canute is rendered by Mr. Lambard, *vicinus*; and thus we read of *reddere firmam unius noctis*, and *reddebat unum diem de firma*; which denote provision for a night and day, the rents about the time of the conquest being all paid in provisions; which custom is said to have been first altered under king Henry I. We also say *to farm* duties, imposts, &c.

Culture of a FARM. See AGRICULTURE.

FARM, as connected with gardening, and susceptible of embellishment. See GARDENING.

In speculation, it might have been expected that the first essays of improvement should have been on a farm, to make it both advantageous and delightful; but the fact was otherwise: a small plot was appropriated to pleasure; the rest was reserved for profit only. And this may, perhaps, have been a principle cause of the vicious taste which long prevailed in gardens. It was imagined that a spot set apart from the rest should not be like them: the conceit introduced deviations from nature, which were afterwards carried to such an excess, that hardly any objects truly rural were left within an inclosure, and the view of those without was generally excluded. The first step, therefore, towards a reformation, was by opening the garden to the country, and that immediately led to assimilating them; but still the idea of a spot appropriated to pleasure only prevailed, and one of the latest improvements has been to blend the useful with the agreeable; even the ornamental farm was prior in time to the more rural; and we have at last returned to simplicity by force of refinement.

Of a pastoral farm.

1. The ideas of pastoral poetry seem now to be the standard of that simplicity; and a place conformable to them is deemed a farm in its utmost purity. An allusion to them evidently enters into the design of the *Leasowes* (A), where they appear so lovely as to endear the memory of their author; and justify the reputation of Mr. Shenstone, who inhabited, made and celebrated the place: it is a perfect picture of his mind, simple, elegant, and amiable; and will always suggest a doubt, whether the spot inspired his verse, or whether, in the scenes which he formed, he only realized the pastoral images which abound in his songs. The whole is in the same taste, yet full of variety; and, except in two or three trifles, every part is rural and natural. It is literally a grazing farm lying round the house; and a walk, as unaffected and as unadorned as a common field-path, is conducted through the several enclosures. But for a detail of the plan and scenery, as illustrative of the present subject, the reader is referred to the particular description of the *Leasowes* published by the late Mr. Doddsley. We shall only take notice of one or two circumstances independent on the general delineation.

The art with which the divisions between the fields are diversified is one of them. Even the hedges are distinguished from each other; a common quickset fence is in one place the separation; in another, it is a lofty hedge-row, thick from the top to the bottom;

in a third, it is a continued range of trees, with all their stems clear, and the light appearing in the intervals between their boughs, and the bushes beneath them; in others, these lines of trees are broken, a few groups only being left at different distances; and sometimes a wood, a grove, a coppice, or a thicket, is the apparent boundary, and by them both the shape and the style of the enclosures are varied.

The inscriptions, which abound in the place, are another striking peculiarity: they are well known and justly admired; and the elegance of the poetry, and the aptness of the quotations, atone for their length and their number. But, in general, inscriptions please no more than once: the utmost they can pretend to, except when their allusions are emblematical, is to point out the beauties, or describe the effects, of the spots they belong to; but those beauties and those effects must be very faint, which stand in need of the assistance. Inscriptions, however, to commemorate a departed friend, are evidently exempt from the censure; the monuments would be unintelligible without them; and an urn, in a lonely grove, or in the midst of a field, is a favourite embellishment at the *Leasowes*: they are indeed among the principal ornaments of the place; for the buildings are mostly mere seats, or little root-houses; a ruin of a priory is the largest, and that has no peculiar beauty to recommend it: but a multiplicity of objects are unnecessary in a farm; the country it commands is full of them; and every natural advantage of the place within itself has been discovered, applied, contrasted, and carried to the utmost perfection, in the purest taste, and with inexhaustible fancy.

Among the ideas of pastoral poetry which are here introduced, its mythology is not omitted: but the allusions are both to ancient and to modern fables; sometimes to the fairies; and sometimes to the naiads and muses. The objects also are borrowed partly from the scenes which this country exhibited some centuries ago, and partly from those of Arcadia: the priory, and a Gothic seat, still more particularly characterized by an inscription in obsolete language and the black letter, belong to the one; the urns, Virgil's obelisk, and a rustic temple of Pan, to the other. All these allusions and objects are indeed equally rural: but the images in an English and a classical eclogue are not the same; each species is a distinct imitative character. Either is proper; either will raise the farm it is applied to above the ordinary level; and within the compass of the same place both may be introduced: but they should be separate: when they are mixed, they counteract one another; and no representation is produced of the times and the countries they refer to. A certain district should therefore be allotted to each, that all the fields which belong to the respective characters may lie together, and the corresponding ideas be preserved for a continuance.

2. In such an assortment, the more open and polished Of an ancient farm. scenes will generally be given to the Arcadian shepherd; and those in a lower degree of cultivation, will be thought more conformable to the manners of the ancient British yeomanry. We do not conceive that the

(A) In Shropshire, between Birmingham and Stourbridge.

Farm.

the country in their time was entirely cleared, or distinctly divided; the fields were surrounded by woods, not by hedges; and if a considerable tract of improved land lay together, it still was not separated into a number of inclosures. The subjects, therefore, proper to receive this character, are those in which cultivation seems to have encroached on the wild, not to have subdued it; as the bottom of a valley in corn, while the sides are still overgrown with wood; and the outline of that wood indented by the tillage creeping more or less up the hill. But a glade of grass, thus circumstanced, does not peculiarly belong to the species: that may occur in a park or pastoral farm; in this, the pastures should rather border on a waste or a common: if large, they may be broken by straggling bushes, thickets, or coppices; and the scattered trees should be beset with brambles and briars. All these are circumstances which improve the beauty of the place; yet appear to be only remains of the wild, not intended for embellishment. Such interruptions must, however, be less frequent in the arable parts of the farm; but there the opening may be divided into several lands, distinguished, as in common fields, only by different sorts of grain. These will sufficiently break the sameness of the space; and tillage does not furnish a more pleasing scene, than such a space so broken, if the extent be moderate, and the boundary beautiful.

As much wood is essential to the character, a spot may easily be found, where turrets rising above the covert, or some arches seen within it, may have the resemblance of a castle or an abbey. The partial concealment is almost necessary to both: for to accord with the age, the buildings must seem to be entire; the ruins of them belong to later days: the disguise is, however, advantageous to them as objects; none can be imagined more picturesque, than a tower bosomed in trees, or a cluster appearing between the stems and the branches. But the superstitions of the times furnish other objects which are more within compass: hermitages were then real: solitary chapels were common, many of the springs of the country being deemed holy wells, were distinguished by little Gothic domes built over them; and every hamlet had its cross; even this, when perfect, set on a little rustic pillar, and that raised upon a base of circular steps, may in some scenes be considerable: if a situation can be found for a Maypole, whence it would not obtrude itself on every view, that also might not be improper; and an ancient church, however unwelcome it may be when it breaks into the design of a park or a garden, in such a farm as this would be a fortunate accident: nor would the old yew in the church-yard be indifferent; it would be a memorial of the times when it was useful.

Many other objects, significant of the manners of our ancestors, might perhaps, upon recollection, occur; but these are amply sufficient for a place of considerable extent; and cottages must abound in every age and every country; and may therefore be introduced in different forms and position. Large pieces of water are also particularly proper; and all the varieties of rills are consistent with every species of farm. From the concurrence of so many agreeable circumstances in this, be the force or the effect of the character what it may, a number of pleasing scenes may be exhibited either in a walk or riding, to be contrasted to those

which in another part of the place may be formed on Arcadian ideas; or even to be substituted in their stead, if they are omitted.

3. A part may also be free from either of these imitative characters, and laid out in a common simple farm. Some of the greatest beauties of nature are to be found in the fields, and attend an ordinary state of cultivation: wood and water may there be exhibited in several forms and dispositions; we may enlarge or divide the inclosures; and give them such shapes and boundaries as we please; every one may be an agreeable spot; together, they may compose beautiful views; the arable, the pasture, and the mead, may succeed one another; and now and then a little wild may be intermixed without impropriety; every beauty, in short, which is not unusual in an inclosed country, whether it arise from neglect or improvement, is here in its place.

The buildings, also, which are frequent in such a country, are often beautiful objects; the church and the mansion are considerable; the farm-yard itself, if an advantageous situation be chosen for it; if the ricks, and the barns, and the out-houses, are ranged with any design to form them into groups, and if they are properly blended with trees; may be made a picturesque composition. Many of them may be detached from the groupe, and dispersed about the grounds: the dove-cote; or the dairy, may be separated from the rest; they may be elegant in their forms, and placed wherever they will have the best effect. A common barn, accompanied by a clump, is sometimes pleasing at a distance; A dutch barn is so when near; and an hay-stack is generally an agreeable circumstance in any position. Each of these may be single; and besides these, all kinds of cottages are proper. Among so many buildings, some may be converted to other purposes than their construction denotes; and, whatever be their exterior, may within be made agreeable retreats, for refreshment, indulgence, or shelter.

With such opportunities of improvement, even to decoration within itself, and with advantages of prospect into the country about it, a simple farm may undoubtedly be delightful. It will be particularly acceptable to the owner, if it be close to his park or his garden: the objects which constantly remind him of his rank, impose a kind of constraint; and he feels himself relieved, by retiring sometimes from the splendor of a seat into the simplicity of a farm: it is more than a variety of scene; it is a temporary change of situation in life, which has all the charms of novelty, ease, and tranquillity, to recommend it. A place, therefore, can hardly be deemed perfect, which is not provided with such a retreat. But if it be the whole of the place it seems inadequate to the mansion: a visitor is disappointed; the master is dissatisfied, he is not sufficiently distinguished from his tenants; he misses the appendages incidental to his seat and his fortune; and is hurt at the similarity of his grounds with the country about them. A pastoral or an ancient farm is a little above the common level; but even these, if brought close up at the door, set the house in a field, where it always appears to be neglected and naked. Some degree of polish and ornament is expected in its immediate environs; and a garden, though it be but a small one, should be interposed between the mansion and any species of farm.

Farm.
Of an or-
namented
farm.

4. A sense of the propriety of such improvements about a seat, joined to a taste for the more simple delights of the country, probably suggested the idea of an *ornamented farm*, as the means of bringing every rural circumstance within the verge of a garden. This idea has been partially executed very often; but no where, perhaps, so completely, and to such an extent, as at Woburn farm, (near Weybridge in Surry.) The place contains 150 acres: of which near 35 are adorned to the highest degree; of the rest, about two thirds are in pasture, and the remainder is in tillage. The decorations are, however, communicated to every part: for they are disposed along the sides of a walk, which, with its appendages, forms a broad belt round the grazing-grounds; and it is continued, though on a more contracted scale, through the arable. This walk is properly garden; all within it is farm; the whole lies on the two sides of a hill, and on a flat at the foot of it: the flat is divided into corn-fields; the pastures occupy the hill; they are surrounded by the walk, and crossed by a communication carried along the brow, which is also richly dressed, and which divides them into two lawns, each completely encompassed with garden.

These are in themselves delightful; the ground in both lies beautifully; they are diversified with clumps and single trees; and the buildings in the walk seem to belong to them. On the top of the hill is a large octagon structure; and, not far from it, the ruin of a chapel. To one of the lawns the ruin appears, on the brow of a gentle ascent, backed and grouped with wood; from the other is seen the octagon, upon the edge of a steep fall, and by the side of a pretty grove, which hangs down the declivity. This lawn is further embellished by a neat Gothic building; the former by the house, and the lodge at the entrance; and in both, other objects of less consequence, little seats, alcoves, and bridges, continually occur.

The buildings are not, however, the only ornaments of the walk; it is shut out from the country, for a considerable length of the way, by a thick and lofty hedge-row, which is enriched with woodbine, jessamine, and every odoriferous plant whose tendrils will entwine with the thicket. A path, generally of sand or gravel, is conducted in a waving line, sometimes close under the hedge, sometimes at a little distance from it; and the turf on either hand is diversified with little groupes, of shrubs, of firs, or the smallest trees, and often with beds of flowers: these are rather too profusely strewed, and hurt the eye by their littleness; but then they replenish the air with their perfumes, and every gale is full of fragancy. In some parts, however, the decoration is more chaste; and the walk is carried between larger clumps of evergreens, thickets of deciduous shrubs, or still more considerably open plantations. In one place it is entirely simple, without any appendages, any gravel, or any sunk fence to separate it from the lawn; and is distinguished only by the richness of its verdure, and the nicety of its preservation. In the arable part it is also of green sward, following the direction of the hedges about the several inclosures: these hedges are sometimes thickened with flowering shrubs; and in every corner or vacant space, is a rosary, a close or an open clump, or a

bed of flowers: but if the parterre has been rifled for the embellishment of the fields, the country has on the other hand been searched for plants new in a garden; and the shrubs and the flowers which used to be deemed peculiar to the one, have been liberally transferred to the other; while their number seems multiplied by their arrangement in so many and such different dispositions. A more moderate use of them would, however, have been better; and the variety more pleasing, had it been less licentious.

But the excess is only in the borders of the walk; the scenes through which it leads are truly elegant, every where rich, and always agreeable. A peculiar cheerfulness overspreads both the lawns, arising from the number and the splendor of the objects with which they abound, the lightness of the buildings, the inequalities of the ground, and the varieties of the plantations. The clumps and the groves, though separately small, are often massed by the perspective, and gathered into considerable groups, which are beautiful in their forms, their tints, and their positions. The brow of the hill commands two lovely prospects: the one gay and extensive, over a fertile plain, watered by the Thames, and broken by St Anne's Hill and Windsor Castle; a large mead, of the most luxuriant verdure, lies just below the eye, spreading to the banks of the river; and beyond it the country is full of farms, villas, and villages, and every mark of opulence and cultivation. The other view is more wooded: the steeple of a church, or the turrets of a seat, sometimes rise above the trees; and the bold arch of Walton Bridge is there a conspicuous object, equally singular and noble. The inclosures on the flat are more retired and quiet; each is confined within itself; and all together they form an agreeable contrast to the open exposure above them.

With the beauties which enliven a garden are every where intermixed many properties of a farm: both the lawns are pastured; and the lowings of the herds, the bleating of the sheep, and the tinklings of the bell-wedder, resound through all the plantations: even the clucking of poultry is not omitted; for a menagerie of a very simple design is placed near the Gothic building; a small serpentine river is provided for the water-fowl; while the others stray among the flowering shrubs on the banks, or straggle about the neighbouring lawn: and the corn-fields are the subjects of every rural employment which arable land from seed-time to harvest can furnish. But though so many of the circumstances occur, the simplicity of a farm is wanting; that idea is lost in such a profusion of ornament; a rusticity of character cannot be preserved amidst all the elegant decorations which may be lavished on a garden.

FARMER, he that tenants a farm, or is lessee thereof. Also generally every lessee for life, years, or at will, is called *farmer*. As this word implies no mystery, except it be that of husbandry, husbandman is the proper addition for a farmer.

FARMER, in mining, is the lord of the field, or one that farms the lot and cope of the king.

FARN ISLANDS, two groups of little islands and rocks, 17 in number, lying opposite to Bamborough castle in Northumberland. At low water the points of several others are visible besides the 17 just mentioned,

Farm
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Farn.

Farnham.

ed. The nearest island to the shore is called the *House island*, and lies exactly one mile and 68 chains from the coast. The most distant is about seven or eight miles. Their produce is kelp, feathers, and a few seals, which the tenant watches and shoots for the sake of the oil and skins. Some of them yield a little grass that may serve to feed a cow or two; which the people transport over in their little boats. The largest or *House island* is about one mile in compass, and has a fort and a lighthouse. It contains about six or seven acres of rich pasture; and the shore abounds with good coals which are dug at the ebb of tide. St Cuthbert is said to have passed the two last years of his life on this island. A priory of Benedictines was afterwards established here, for six or eight monks, subordinate to Durham. A square tower, the remains of a church, and some other buildings, are still to be seen on this island; and a stone coffin, which is pretended to be that of St Cuthbert. At the north end of the isle is a deep chasm, from the top to the bottom of the rock, communicating with the sea; through which, in tempestuous weather, the water is forced with great violence and noise, and forms a fine jet d'eau of 60 feet high. It is called by the inhabitants of the opposite coast, the *Churn*. One of the islands in the most distant groupe is called the *Pinnacles*, from some vast columnar rocks at the south end, even at their sides, flat at the tops, and entirely covered with guillemots and shags. The fowlers pass from one to the other of these columns by means of a board, which they place from top to top, forming a narrow bridge over such a dreadful gap that the very sight of it strikes one with horror.

FARNABIE (Thomas), son of a carpenter at London, born in 1575, staid a short while at Oxford; where being enticed to abandon his religion, he went to Spain, and was there educated in a college belonging to the Jesuits. Being weary of their severe discipline, he went with Sir John Hawkins and Sir Francis Drake in their last voyage in 1595. He was afterwards a soldier in the Low Countries: but being reduced to great want, returned to England, where wandering about for some time under the name of *Thomas Bainrafe*, the anagram of his name, he settled at Mattock in Somersetshire, and taught a grammar-school with good reputation. He removed to London, and opened a school with large accommodations for young gentlemen. While he taught this school, he was made master of arts at Cambridge, and incorporated into the university of Oxford. Thence he removed, in 1636, to Seven-oaks in Kent; and taught the sons of several noblemen and gentlemen, who boarded with him, with great success, and grew rich. His works gained him reputation. Upon the breaking out of the civil commotions in 1641, he was cast into prison. It was debated in the house of commons, whether he should be sent to America; but this motion being rejected, he was removed to Ely-house in Holborn, and there he died in 1647. Mr Farnabie was a very eminent grammarian; and many writers have spoken with great approbation of his labours. M. Bayle in particular says, "His notes upon most of the ancient Latin poets have been of very great use to young beginners; being short, learned, and designed chiefly to clear up the text."

FARNHAM, or FERNHAM; a town of Surry, and

capital of the hamlet of its own name, 41 miles from London on the Winchester road. It is a large populous place, situated on the river Wey, and supposed to have its name from the fern which abounded here. It was given by the West Saxon king Ethelbald to the see of Winchester; the bishops of which have generally resided in the castle here, in the summer time, ever since the reign of king Stephen, whose brother, its then bishop, first built it. It was a magnificent structure, with deep moats, strong walls and towers at proper distances, and a fine park; but it is much decayed. The town, which has many handsome houses, and well paved streets, is governed by 12 masters or burgesses, of whom two are bailiffs, (chosen annually). They have the profit of the fairs and markets, and the assize of bread and beer; and hold a court every three weeks, which has power of trying and determining all actions under 40s. From Michaelmas to Christmas here is a good market for oats; and one of the greatest wheat markets in England, especially between All-Saints day and midsummer. The toll-dish here was once reckoned worth 200 l. a year; but it is much diminished, since the people about Chichester and Southampton began to send their meal to London by sea. But this loss is amply made up by the vast growth of hops here, of which there are 300 or 400 acres of plantations about this town, and they are said to outdo the Kentish hop-yards both in quantity and quality. This town sent members to parliament in the reign of Edward II. but never since. The magistrates have their privileges from the bishop of Winchester, to whom they pay an acknowledgment of 12d. a year. The market is on Thursday: fairs, Holy Thursday, June 24. and November 2. Here are a free school, and a great market for Welsh hosiery.

FARNOVIANS, in ecclesiastical history, a sect of Socinians, so called from Stanislaus Farnovius, who separated from the other Unitarians in the year 1568, and was followed by several persons eminent for their learning. This sect did not last long; for having lost their chief, who died in 1615, it was scattered abroad and reduced to nothing. Farnovius was engaged by Gonesius to prefer the Arian system to that of the Socinians, and consequently asserted, that Christ had been produced out of nothing by the Supreme Being before the creation of this terrestrial globe. His sentiments concerning the Holy Ghost are not certainly known; however, it appears that he warned his disciples against paying the tribute of religious worship to the Divine Spirit.

FARQUHAR (George), an ingenious poet and dramatic writer, the son of a clergyman in Ireland, was born at Londonderry in 1678. He was sent to Trinity College, Dublin; but his volatile disposition not relishing a college life, he betook himself to the stage; where, having dangerously wounded a brother-actor in a tragic scene, by forgetting to change his sword for a foil, it shocked him so much that he left the Dublin theatre and went to London. Here he procured a lieutenant's commission by the interest of the earl of Orrery; which he held several years, and gave many proofs both of courage and conduct. In 1698, he wrote his first comedy called *Love and a Bottle*; which, for its sprightly dialogue and busy scenes, was well received. In the beginning of the year 1700, which was the

Farnham
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Farquhar.

Farquhar. the jubilee year at Rome, he brought out his *Constant Couple, or a Trip to the Jubilee*: and suited Mr Wilks's talents so well in the character of Sir Harry Wildair, that the play gained almost as much reputation as the poet. This tempted him to continue it in another comedy called *Sir Harry Wildair, or The sequel of the Trip to the Jubilee*; in which Mrs Oldfield acquired great applause. In 1702, he published his *Miscellanies*, which contain a variety of humorous sallies of fancy. In 1703, appeared the *Inconstant, or the Way to win him*; in 1704, a farce called the *Stage-coach*; in 1705, *The Twin Rivals*; and in 1706, the *Recruiting Officer*, founded on his own observations while on a recruiting party at Shrewsbury. His last comedy was the *Beaux Stratagem*, of which he did not live to enjoy the full success. Mr Farquhar married in 1703. Before that time his manner of life had been rather dissipated. The lady, therefore, who afterwards became his wife, having fallen violently in love with him, but judging that a gentleman of his humour would not easily be drawn into the trammels of matrimony, contrived to have it given out that she was possessed of a large fortune; and finding means afterwards to let Mr Farquhar know her attachment to him, interest and vanity got the better of his passion for liberty, and the lady and he were united in the hymenial bands. But how great was his disappointment, when he found all his prospects overclouded so early in life (for he was then no more than 24), by a marriage from which he had nothing to expect but an annual increase of family, and an enlargement of expence in consequence of it far beyond what his income would support. Yet, to his honour be it told, though he found himself thus deceived in a most essential particular, he never was known once to upbraid his

wife with it; but generously forgave an imposition which love for him alone had urged her to, and even behaved to her with all the tenderness and delicacy of the most indulgent husband. Mrs Farquhar, however, did not very long enjoy the happiness she had purchased by this stratagem; for the circumstances that attended this union were in some respect perhaps the means of shortening the period of the captain's life. For, finding himself considerably involved in debt in consequence of their increasing family, he was induced to make application to a certain noble courier, who had frequently professed the greatest friendship for him, and given him the strongest assurances of his intended services. This pretended patron repeated his former declarations; but, expressing much concern that he had nothing at present immediately in his power, advised him to convert his commission into money to answer his present occasions, and assured him that in a short time he would procure another for him. Farquhar, who could not bear the thoughts of his wife and family being in distress, followed this advice, and sold his commission; but, to his great mortification and disappointment, found, on a renewal of his application to this inhuman nobleman, that he had either entirely forgotten, or had never intended to perform, the promise he had made him. This distracting frustration of all his hopes fixed itself so strongly on our author's mind, that it soon brought on him a sore, tho' not a very sudden, declension of nature, which at length carried him off the stage of life in 1707, before he arrived at 30 years of age.—His comedies are so diverting, and the characters so natural, that his plays still continue to be represented to full houses.

FARRIER, one whose employment is to shoe horses, and cure them when diseased or lame.

F A R R I E R Y,

THE art of preventing, curing, or palliating, the diseases of horses.

The practice of this useful art has been hitherto almost entirely confined to a set of men who are totally ignorant of anatomy and the general principles of medicine. It is not therefore surprising, that their prescriptions should be equally absurd as the reasons they give for administering them. It cannot indeed be expected that farriers, who are almost universally illiterate men, should make any real progress in their profession. They prescribe draughts, they rowel, cauterise, &c. without being able to give any other reason for their practice, but because their fathers did so before them. How can such men deduce the cause of a disease from its symptoms, or form a rational method of cure, when they are equally ignorant of the causes of diseases and the operation of medicines?

The miserable state of this useful art has determined us to select, from the best authors, such a system of practice as seems to be formed on rational principles; this, we hope, will be a sufficient apology for being so full upon this article.

SECT. I. General Directions with regard to the Management of Horses.

1. It ought to be laid down as a general rule, to

give horses as few medicines as possible; and by no means to comply with the ridiculous custom of some, who are frequently bleeding, purging, and giving balls, though their horses be in perfect health; and have no indication that requires such treatment.

2. Proper management in their feeding, exercise, and dressing, will alone cure many disorders, and prevent most; for the simplicity of a horse's diet, which chiefly consists of grain and herbage, when good in kind, and dispensed with judgment, secures him from these complicated disorders which are the general effects of intemperance in the human body.

3. In France, Germany, and Denmark, horses are seldom purged; there they depend much on alteratives; the use of the liver of antimony we have from the French, which is in general a good medicine for that purpose, and may, in many cases, be substituted in the room of purging.

4. As hay is so material an article in a horse's diet, great care should be taken to procure the best: when it is not extraordinary, the dust should be well shook out before it is put in the rack; for such hay is very apt to breed vermin.

5. Beans afford the strongest nourishment of all grain; but are fittest for laborious horses, except on particular occasions. In some seasons they breed a kind of vermin called the *red bugs*, which is thought to be dangerous;

Manage-
ment of
horses.

gerous; the best method in such a case is to procure them well dried and split.

6. Bran scalded is a kind of panada to a sick horse: but nothing is worse than a too frequent use of it, either dry or scalded; for it relaxes and weakens the bowels too much. The botts in young horses may be owing to too much musty bran and chaff, given with other foul food to make them up for sale; particular care therefore should be taken that the bran be always sweet and new.

7. Oats, well ripened, make a more hearty and durable diet than barley, and are much better suited to the constitutions of British horses. A proper quantity of cut straw and hay mixed with them, is sometimes very useful to horses troubled with botts, indigestion, &c.

8. Horses who eat their litter, should particularly have cut straw and powdered chalk given them with their feed; as it is a sign of a depraved stomach, which wants correcting.

9. The salt-marshes are good pasture for horses who have been surfeited, and indeed for many other disorders: they purge more by dung and urine than any other pasture, and make afterwards a firmer flesh; their water is for the most part brackish, and of course, as well as the grass, saturated with salts from the seawater.

10. A summer's grass is often necessary; more particularly to horses glutted with food, and which use little exercise: but a month or two's running is proper for most; those especially who have been worked hard, and have stiff limbs, swelled legs, or wind-galls. Horses whose feet have been impaired by quittors, bad shoeing, or any other accidents, are also best repaired at grass. Those lamenesses particularly require turning out to grass, where the muscles or tendons are contracted or shrunk; for by the continual gentle exercise in the field, with the assistance of a patten-shoe on the opposite foot, the shortened limb is kept on the stretch, the wasted parts are restored to their ordinary dimensions, and the limb again recovers its usual tone and strength.

11. The fields which lie near great towns and are much dunged, are not proper pasture for horses; but on observation appear very injurious to them, if they feed thereon all the summer.

12. Horses may be kept abroad all the year, where they have a proper stable or shed to shelter them from the weather, and hay at all times to come to. So treated, they are seldom sick; their limbs are always clean and dry; and with the allowance of corn, will hunt, and do more business than horses kept constantly within doors.

13. If horses, when taken from grass, should grow hot and costive, mix bran and chopt hay with their corn; and give them sometimes a feed of scalded bran for a fortnight, or longer: let their exercise and diet be moderate for some time, and increase both by degrees.

14. When horses are soiled in the stable, care should be taken that the herbage is young, tender, and full of sap; whether it be green barley, tares, clover, or any thing else the season produces; and that it be cut fresh once every day at least, if not oftener.

15. When horses lose their flesh much in soiling, they should in time be taken to a more solid diet: for it is

not in soiling as in grazing; where, though a horse loses his flesh at first, yet after the grass has purged him, he soon grows fat.

16. Young horses, who have not done growing, must be indulged more in their feeding than those come to their maturity; but if their exercise is so little as to make it necessary to abridge their allowance of hay, a little fresh straw should constantly be put in their racks to prevent their nibbling the manger, and turning crib-biters; they should also be sometimes strapped back in order to cure them of this habit.

17. It is obvious to every one, what care should be taken of a horse after violent exercise, that he cool not too fast, and drink no cold water, &c. for which reason we shall wave particular directions.

18. Most horses fed for sale have the interslices of their muscles so filled with fat, that their true shapes are hardly known. For which reason a horse just come out of the dealer's hand should at first be gently used. He ought to lose blood, and have his diet lowered, though not too much: walking exercise is most proper at first, two hours in the day; in a week or fortnight two hours at a time, twice a-day; after this usage for a month, bleed him again, and give him two or three times a-week scalded bran, which will prepare him for purging physic, that may now be given safely, and repeated at the usual intervals.

19. When a horse comes out of a dealer's hands, his cloathing must be abated by degrees, and care taken to put him in a moderately warm stable; otherwise the sudden transition would be attended with the worst consequences.

SECT. II. *Of Blood-letting.*

I. HORSES who stand much in stable, and are full fed, require bleeding now and then; especially when their eyes look heavy, dull, red, and inflamed; as also when they feel hotter than usual, and mangle their hay.

Young horses should be bled when they are shedding their teeth, as it takes off those feverish heats they are then subject too. But the cases that chiefly require bleeding, are colds, fevers of most kinds, falls, bruises, hurts of the eyes, strains, and all inflammatory disorders, &c.

It is right to bleed a horse when he begins to grow fleshy at grass, or at any other time when he looks heavy; and it is generally proper to bleed before purging.

Let your horse always be bled by measure, that you may know what quantity you take away: two or three quarts are always enough at one time; when you repeat it, allow for the disorder and the horse's constitution.

Although the operation of blood-letting is generally thought to be pretty well known, yet there are many untoward accidents that frequently happen from the unskilful and unexperienced in performing it. The following directions and cautions on this head are extracted from Mr Clark's *Treatise on the Prevention of Diseases incidental to Horses*.

As horses are naturally timorous and fearful, which is too frequently increased by bad usage and improper chastisement, they require in some cases, particularly in this of bleeding, to be taken unawares or by surprise,

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prise, and the orifice made into the vein before their fears are alarmed. For this reason, the fleam and blood-stick, as it is called, have been long in use, and in skilful hands are not improper instruments for the purpose; although with many practitioners the spring-fleam would be much safer, and on that account ought to be preferred. When a lancet is used, the instant the horse feels the point of it, he raises and shakes his head and neck, in order to shun the instrument before the operator has time to make a proper orifice, which frequently proves too small or too large; for this reason, those who have tried the lancet have been obliged to lay it aside.

Many persons tie a ligature or bandage round the neck, in order to raise the vein, and that they may strike the fleam into it with the greater certainty; but a slight view of its effects in preventing this, and its other consequences, will shew the impropriety of the practice.

When a ligature is tied round the neck previous to bleeding in the jugular veins, it is to be observed, that it stops the circulation in both veins at the same time; hence they become turgid and very full of blood, in so much that they feel under the finger like a tight cord; and as the parts around them are loose and soft, when the stroke is given to the fleam, the vein by its hardness or tightness slips to one side, of course it eludes the stroke; hence a deep wound is made by the fleam to no purpose, and this is sometimes too frequently repeated. Unskilful people have likewise a custom of waving or shaking the blood-stick before they strike the fleam in view of the horse, whose eye is fixed on that instrument; and when they intend to give the stroke, they make a greater exertion: hence the horse being alarmed by its motion, raises his head and neck, and a disappointment follows. The struggle that ensues by this means prolongs the operation; the ligature at the same time being still continued round the neck, a total stagnation of the blood in the vessels of the head takes place; and hence it frequently happens, that the horse falls down in an apoplectic fit. In such cases the operator being disconcerted, generally desists from any farther attempts to draw blood at that time, under the idea that the horse was vicious and unruly, although the very treatment the horse had just undergone rendered bleeding at this time the more necessary, in order to make a speedy revulsion from the vessels of the head. Therefore, a ligature or bandage ought never to be used till such time as the opening is made into the vein; and even then it will not be necessary at all times if the horse can stand on his feet, as a moderate pressure with the finger on the vein will make the blood flow freely; but if the horse is lying on the ground, a ligature will be necessary.

But farther, the concussion or shock the horse receives from his falling down in the above situation, which will always happen if the ligature is too long continued, may cause a blood-vessel within the head to burst, and death may be the consequence.

Another custom equally absurd is allowing the blood to fall in a dunghill amongst straw, in dry sand, or in dry dust, by which means no distinct idea can be formed of the quantity that is or ought to be taken away. In such cases horses have fallen down in a faint from the loss of too much blood, before the operator thought

of stopping up the orifice. For this and a variety of other reasons which might be mentioned, a measure as above observed, ought always to be used, in order to ascertain the quantity of blood that is taken away.

In pinning up the orifice, some have a custom of raising or drawing out the skin too far from the vein; hence the blood flows from the orifice in the vein into the cellular substance between it and the skin, which causes a large lump or swelling to take place immediately: this frequently ends in what is called a *swelled neck*; a suppuration follows, which proves both tedious and troublesome to cure. In cases where a horse may be tied up to the rack after bleeding in the neck, pinning up the external orifice may be dispensed with; but when a horse is troubled with the gripes or any other acute disease, in which he lies down and tumbles about, it is necessary that the orifice be pinned up with care, in order to prevent the loss of too much blood.

As the neck or jugular vein on the near side is commonly opened for convenience by those who are right-handed, the young practitioner should learn to perform on both sides of the neck. This he will find in practice to be not only useful but necessary, as he may frequently have occasion to draw blood from horses in very awkward situations; he will likewise find his account in it in a variety of cases, which it is needless here to particularise.

The proper place for making the opening in the neck or jugular vein is likewise necessary to be attended to: for when the orifice is made too low, or about the middle of the neck, where the vein lies deep under the muscular teguments, the wound becomes difficult to heal, and frequently ends in a suppuration, with a jetting out of proud flesh from the orifice; which, unluckily, is as unskilfully treated in the common method of cure, viz. by introducing a large piece of corrosive sublimate into the wound: this not only destroys the proud flesh in the lips of the wound, but a considerable portion of the flesh around it; and in farriery it is called *coreing out the vein*. It frequently happens, that this corrosive application destroys the vein likewise; and sometimes violent hemorrhages follow, so as to endanger the life of the animal.

The most proper place for making the opening in the jugular veins is where the teguments are thinnest, which is about a hand-breadth from the head, and about one inch below the branching or joining of the vein which comes from the lower jaw, and which may be distinctly seen when any pressure is made on the main branch of the vein.

In performing the operation with a fleam, the operator should hold the fleam between the fore-finger and thumb of the left hand; with the second finger he is to make a slight pressure on the vein, and before it becomes too turgid or full make the opening; the same degree of pressure is to be continued on the vein, till such time as the quantity of blood to be taken away is received into a proper measure.

Another great error, which generally prevails in opening the veins with a fleam, is the applying too great force, or giving too violent a stroke to it, by which it is forced through the opposite side of the vein: hence there is danger of wounding the coats of the arteries, as they generally lie under the veins; or, in some particular places, of wounding the tendons, especially when this

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this operation is performed in the legs, thighs, &c. or in the veins, commonly called the *plate veins*, under the breast, the consequences are frequently very troublesome to remove, and in some cases prove fatal. Mr Gibson, in his Treatise on the Diseases of Horses, mentions a case of a fine horse that was bled in the plate veins for a lameness of the shoulder, which was followed with a hard oval swelling about the size of a goose egg, which extended upwards on the breast, and likewise down the leg, attended with excessive pain, fever, deadness in the horse's looks, and all the other symptoms of a beginning mortification.

In order to avoid the consequences sometimes attending these local operations in the breast, legs, &c. and as horses are more or less troublesome and restless, whereby accidents of this kind may happen, it will perhaps be advisable, in most cases of lameness, &c. to draw blood from the larger veins in the neck only, where there is less danger of accidents, more especially if a spring fleam is used: for although it might be of some advantage in particular cases to draw blood as near the affected part as possible, yet the bad consequences frequently attending it ought to counterbalance any advantages that may be expected from it, especially as the quantity of blood drawn from the small veins is but inconsiderable, and of course no great benefit can be expected from it in horses when they are diseased.

The principal view in drawing blood is the lessening of its quantity, by which the remaining mass circulates with more freedom in the vessels; it likewise takes off the inflammatory tendency of the blood, removes spasms, &c. and prevents other bad consequences that may follow, especially in plethoric habits: and it ought always to be remembered, that when the signs or symptoms of a disease are taken from the motion of the blood, the disorders arising from it depend upon its circulation being either increased or diminished: hence, therefore, all the changes which take place in the texture, quantity, and quality of the blood, are attended with a diminution or increase of its velocity.

Although the cases which may require bleeding are numerous, yet one general caution is necessary, namely, never to take away blood but when it is absolutely necessary: for it is a fluid that may be easily taken away, but cannot be so easily replaced; besides, the practice of bleeding frequently, or at stated times, is exceedingly improper, as it disposes the body to become lax, weak, and plethoric. In bleeding, therefore, a due regard must always be had to the constitution, age, strength, &c. of horses, and the state or habit of body they are in at the time.

Although we ought to be sparing of drawing blood from horses on trifling occasions when they may be said to be in health, yet when cases occur that do require it, it may not only safely, but usefully, be recommended to take away a greater quantity at once than is generally done; that is, from six to eight pounds, which will be about three or four quarts English measure, according to the urgency of the symptoms, &c. at the time, strength and age of the horse considered. For as horses are very subject to inflammatory diseases and those that are of the spasmodic kind, and as bleeding plentifully relaxes the whole system in these cases, the taking away a small quantity of blood, about one

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quart or two pounds, is in fact trifling with the disease; the horse is said to have been *blooded*, and that satisfies his owner and the farrier; time is lost; the disease acquires strength; it will then be beyond the power of art to mitigate or to conquer it: hence the horse falls a sacrifice to timidity and ignorance. It is to be remembered, that inflammatory diseases, particularly when the bowels are affected, make a very rapid progress in horses; and if they are not overcome at the beginning by bleeding plentifully, the horse commonly dies in 24 or 30 hours of a gangrene and mortification in the intestines.

SECT. III. *Of Purging.*

PURGING is often necessary in gross full horses, in some disorders of the stomach, liver, &c. but should be directed with caution. Before a purge is given to any horse, it is necessary some preparation should be made for it, in order to render the operation more safe and efficacious: thus a horse that is full of flesh should first be bled, and at the same time have his diet lowered for a week, especially those that have been pampered for sale; several mashes of scalded bran should also previously be given, in order to open the bowels, and unload them of any indurated excrement, which sometimes proves an obstacle to the working of the physic, by creating great sickness and griping.

Let it be remembered, that a horse is purged with difficulty; that the physic generally lies 24 hours in the guts before it works; and that the tract of bowels it has to pass through is above 30 yards, all lying horizontally: consequently resinous and other improper drugs may, and often do, by their violent irritation, occasion excessive gripings and cold sweats, shave off the very mucus or lining of the guts, and bring on inflammations, which often terminate in mortifications and death. It is remarkable too, that the stomach and guts of a horse are but thin, compared to some other animals of the same bulk, and therefore must be more liable to inflammation and irritation.

Horses kept much in the stable, who have not the proper benefit of air and exercise in proportion to their food, should in spring have a mild purge or two after a previous preparation by bleeding, lowering their diet, and scalded mashes.

Horses that fall off in their stomach, whether it proceeds from too full feeding, or ingendering crudities and indigested matter, should have a mild purge or two.

Horses of a hot temperament will not bear the common aloetic purges: their physic therefore should be mild and cooling.

Purging is always found very beneficial in stubborn dry coughs: but mild mercurials joined with them make them yet more efficacious.

Horses of a watery constitution, who are subject to swelled legs that run a sharp briny ichor, cannot have the causes removed any way so effectually as by purging.

The first purge you give to a horse should be mild, in order to know his constitution.

It is a mistaken notion, that if a proper prepared purge does not work to expectation, the horse will be injured by it; for though it does not pass by stool, its operation may be more efficacious as an alterative to

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purify the blood, and it may pass by urine or other secretions.

Purging medicines are very successfully given in small quantities, mixed with others; and act then as alteratives.

If mercurial physic is given, care should be taken that it be well prepared; and warmer cloathing and greater circumspection are then required.

Purges should be given early in the morning upon an empty stomach; about three or four hours after the horse has taken it, he should have a feed of scalded bran; and a lock or two of hay may then be put into his rack. The same day give him two or more mashes; but should he refuse warm meat, he may be allowed raw bran.

All his water should be milk-warm, and have a handful of bran squeezed in it; but if he refuses to drink white water, give it him without bran.

Early the next morning give him another mash; but if he refuses to eat it, give him as much warm water as he will drink: let him be properly clothed, and rode gently about. This should be done two or three times a-day, unless he purges violently; once or twice will then be sufficient: at night give him a feed of oats mixed with bran.

During the working, a horse should drink plentifully; but if he will not drink warm water, he must be indulged with cold, rather than not drink at all.

We shall here insert some general forms of purges.

TAKE socotorine aloes ten drams, jalap and salt of tartar each two drams, grated ginger one dram, oil of cloves 30 drops; make them into a ball with syrup of buckthorn. Or,

TAKE aloes and cream of tartar each one ounce, jalap two drams, cloves powdered one dram, syrup of buckthorn a sufficient quantity.

Or the following, which has an established character among sportsmen:

TAKE aloes from ten drams to one ounce and an half, myrrh and ginger powdered each half an ounce, saffron and oil of aniseed each half a dram.

Mr. Gibson recommends the following:

TAKE socotorine aloes ten drams, myrrh finely powdered half an ounce, saffron and fresh jalap in powder of each a dram; make them into a stiff ball with syrup of roses, then add a small spoonful of rectified oil of amber.

The socotorine aloes should always be preferred to the Barbadoes or plantation aloes, though the latter may be given to robust strong horses; but even then should always be prepared with the salt or cream of tartar, which, by opening its parts, prevents its adhesion to the coats of the stomach and bowels; from whence horrid gripings, and even death itself, has often ensued. This caution is well worth remarking, as many a horse hath fallen a sacrifice to the neglect of it.

Half an ounce of Castile soap, to a horse of a gross constitution, may be added to any of the above; and the proportions may be increased for strong horses.

When mercurial physic is intended, give two drams of calomel over night, mixed up with half an ounce of diapente and a little honey, and the purging ball the next morning.

The following, when it can be afforded, is a very gentle and effectual purge, particularly for fine delicate

horses: and if prepared with the Indian rhubarb, will not be expensive. Purging.

TAKE of the finest socotorine aloes one ounce, rhubarb powdered half an ounce or six drams, ginger grated one dram; make into a ball with syrup of roses.

The following purging drink may be given with the utmost safety; it may be quickened or made stronger, by adding an ounce more lenna, or two drams of jalap.

TAKE fenna two ounces; infuse it in a pint of boiling water two hours, with three drams of salt of tartar; pour off, and dissolve in it four ounces of Glauber's salts, and two or three of cream of tartar.

This last physic is cooling, easy, and quick in its operation; and greatly preferable in all inflammatory cases to any other purge, as it passes into the blood, and operates also by urine.

When horses lose their appetite after purging, it is necessary to give them a warm stomach-drink made of an infusion of camomile flowers, aniseeds, and saffron: or the cordial-ball may be given for that purpose.

Should the purging continue too long, give an ounce of diascordium in an English pint of Port-wine; and repeat it once in 12 hours, if the purging continues. Plenty of gum-arabic water should also be given; and in case of violent gripes, fat broth glysters or tripe liquor should be often thrown up, with 100 drops of laudanum in each.

The Arabic solution may be thus prepared.

TAKE of gum-arabic and tragacanth of each four ounces, juniper-berries and caraway-seeds of each an ounce, cloves bruised half an ounce; simmer gently in a gallon of water till the gums are dissolved: give a quart at a time in half a pail of water; but if he will not take it freely this way, give it him often in a horn.

When a purge does not work, but makes the horse swell and refuse his food and water, which is sometimes the effect of bad drugs or catching cold, warm diuretics are the only remedy; of which the following are recommended.

TAKE a pint of white wine, nitre one ounce; mix with it a dram of camphire, dissolved in a little rectified spirit of wine; then add two drams of oil of juniper, and the same quantity of unrectified oil of amber, and four ounces of honey or syrup of marshmallows.

When a horse swells with much physic, do not suffer him to be rode about till he has some vent; but rather lead him gently in hand till some evacuation is obtained.

As it is observed, that horses more willingly take sweet and palatable things than those that are bitter and of an ill taste, care should be taken that the latter be given in balls, and that their drinks be always contrived to be as little nauseous as possible, and sweetened either with honey or liquorice. Those that are prepared with gross powders are by no means so agreeable to a horse as those made by infusion; as the former often clam the mouth, irritate the membranes about the palate and throat, and frequently occasion the cough they are intended to prevent.

Balls should be of an oval shape, and not exceed the size

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size of a pullet's egg: when the dose is larger, it should be divided into two; and they should be dipt in oil, to make them slip down the easier.

* *Stable Directory*, p. 36.

The following cathartic balls are recommended by Mr Taplin*; the ingredients of which are differently proportioned, so as to suit different circumstances in respect to strength, age, size, and constitution.

1. Socotorine aloes one ounce; India rhubarb two drachms; jalap and cream of tartar each one drachm; ginger (in powder) two scruples: essential oil of cloves and aniseed each twenty drops; syrup of buckthorn a sufficient quantity to form the balls.
2. Socotorine aloes ten drams; rhubarb, jalap, and ginger, each two drams; cream of tartar three drams, and syrup of buckthorn to make the ball.
3. Barbadoes aloes nine drams; jalap, Castile soap, and cream of tartar, of each two drams; diacrydium and ginger (in powder) each a dram; syrup of buckthorn sufficient to make the ball.
4. Barbadoes aloes ten drams; Castile soap and jalap (in powder) of each half an ounce; cream of tartar and ginger each two drams; oil of aniseed forty drops; of cloves twenty drops; which form into a ball with syrup of roses or buckthorn.

† From *Clark's Observations*, p. 287.

SECT. IV. *Of Clysters* †.

CLYSTERS administered to horses, are of greater importance in relieving them from many acute complaints, than is generally imagined; and it were to be wished, that, in place of the more expensive cordial drenches, &c. which are but too frequently given in most of these cases, a simple clyster of warm water, or thin water-gruel, were substituted in their stead; the latter proving of great benefit, whilst the former too frequently prove hurtful.

Clysters serve not only to evacuate the contents of the intestines, but also to convey very powerful medicines into the system, when perhaps it is not practicable to do it by the mouth: for although they are only conveyed into the larger intestines, and perhaps hardly penetrate into the smaller; still they are extremely useful, by fomenting as it were the latter, and at the same time by softening the hardened excrement that is accumulated in the former, and rendering it so soft as to be expelled out of the body, by which flatulencies or other offending matters that may be pent up in them are likewise expelled. Besides, by their warmth and relaxing powers, they act as a fomentation to the bowels; hence they may be of considerable service in removing spasmodic constrictions in the bowels, carrying off flatulencies, and in preventing inflammation in the intestines, &c.; or, by conveying opiates to the parts affected, give speedy relief in cholics, &c. &c.

The use of emollient clysters in fevers are considerable. They act by revulsion, and relieve the head when too much affected. Besides, by throwing in a quantity of diluting liquor into the intestines, it not only relaxes and cleanses them, but they may be said to cool the body in general; at the same time, a considerable portion of the liquid is absorbed and conveyed into the mass of blood, by which means it is diluted; and, in

particular complaints in the bowels, clysters give almost immediate relief, as the remedies, when judiciously prescribed, pass immediately to the parts affected, with little or no alteration from the powers of the body.

Nor is the use of clysters confined to medicines only; food and nourishment may be conveyed into the system in this way, when a horse is unable to swallow any thing by the mouth. Horses have frequently been supported for several days together by nourishing clysters, made of thick water-gruel, during violent inflammations or tumors in the throat, till such time as they have been disengaged or suppured.

Nor will these effects appear strange to those who have an acquaintance with the anatomical structure of the body. For the sake of those who have not, it may just be sufficient to observe, that certain vessels called lacteals, whose mouths open into the inner cavity of the intestines, absorb or drink up the chyle or nourishment that is produced from the food, and convey it into the mass of blood. The same process takes place when nourishment is conveyed into the intestines by the anus or fundament: only the food requires to be so far prepared, broken down and diluted with water, as to render it fit to be absorbed by the vessels mentioned above.

In administering clysters, it ought always to be observed, that the contents of the clyster be neither too hot nor too cold, as either of these extremes will surprise the horse, and cause him to eject or throw it out before it has had time to have any effect. Previous to introducing the clyster-pipe, the operator, after anointing his hand and arm with oil, butter, or hog's-lard (observing, at the same time, that the nails of his fingers are short), may introduce it into the rectum, and draw out the hardened dung gradually. This operation, in farriery, is termed *back-racking*; and becomes the more necessary, as it frequently happens that great quantities of hardened dung is, in some cases, collected in the rectum, and which the horse cannot void easily without assistance of this kind.

The composition of clysters should be extremely simple: on that account they will be easily prepared, and as easily administered, provided the operator is furnished with a suitable instrument for the purpose. The generality of clyster-pipes that are used, are by far too small and too short: although it may appear a kind of paradox, yet it is a fact, that a clyster-pipe of a larger size than the ordinary ones, and of a proper thickness, is much easier introduced into the anus than one that is considerably smaller. It is likewise obvious, that when the pipe is too short, it renders clysters of no use, because it cannot convey the clysters so far up into the intestines as is necessary for them to be retained: a small short pipe of six or eight inches long, is not capable of conveying the injection to the end of the rectum, which, in a horse of a middling size, is about 16 or 18 inches long.

But farther, after the hardened dung is taken out of the rectum by the operation abovementioned, the bladder being distended and full of urine, it cannot exert its contracting power immediately, so as to expel its contents; it therefore presses up the empty rectum, and forms as it were a kind of tumor in it: if the pipe

Clysters. is too short, it cannot reach beyond this rising in the rectum, which forms as it were a declivity back towards the anus; and hence the liquor regurgitates or flows back at the anus as soon as it is discharged from the pipe.

The smallness of the bag or bladder, which is generally proportioned to that of the pipe, is another very material objection to these instruments, as it seldom contains one quart of liquid; from which circumstance, very little benefit can be derived from the use of them in such large intestines as those of a horse. Doctor Bracken, in his first volume, page 203. has a very judicious remark on the use of clysters. He observes, that "the colon of a horse seems to be three guts, by reason of the two necks of about half a yard each, is drawn up into many cells or purses by means of two ligaments, one of which runs along the upper and the other the under side of it, which, with the assistance of a valve or flap at its beginning, hinder the excrements either from returning back into the small guts, or falling too soon downwards, before the chyle or milky substance prepared from the food be sent into its proper vessels. And, indeed, the cæcum or blind gut, which is the first of the three larger guts, seems to be so contrived in the manner of a valve, to hinder the aliment and chyle from passing too soon into the colon; for, if the aliment and chyle were not in some measure hindered in their passage through these large guts, the body could not be sufficiently supplied with nourishment. The first of these colons is about a yard and a half in length, the second about a yard, and the third, or that part which joins the rectum or arse-gut, near six yards in length; so that the colon of a horse 14 hands high, may be said to be nearly eight yards and a half long; and, from it, along the rectum or straight gut to the anus, where the excrements are discharged, is not above half a yard; so that it is plain, clysters operate mostly in the colon; though I must say they are given in too small quantities; for what signifies two quarts of liquor in a gut nine yards long, and four or five inches diameter, in a natural state; but in the colic, it is so distended with flatulencies, that its diameter exceeds seven or eight inches, as I have frequently observed in those dying of that distemper."

Large syringes are frequently used for the purpose of giving clysters; but of all the instruments ever invented, they seem the most improper for horses. The shortness and smallness of their ivory pipes, are not only a material objection against the use of them, but they are apt to tear and wound the gut; for if a horse should prove restless, either from pain, as in cases of the gripes, or from viciousness, the syringe and pipe being quite inflexible, in the struggle to throw up the injection the gut may be wounded or hurt, by which a discharge of blood and other bad consequences may follow. But although there was not the least chance of their hurting the horse or wounding the gut, yet the force with which they throw up the liquor, always causes a surprise, of course a resistance, attended with a vigorous effort to throw it out; which indeed frequently happens before the pipe of the syringe is withdrawn, and frequently upon the operator.

The most proper instrument for the giving of cly-

sters, is a simple bag or ox-bladder, which will hold two or three quarts, tied to the end of a wooden pipe about 14 or 15 inches long, one inch and a half diameter where the bag is tied, and of a gradual taper to the extremity, where the thickness should suddenly increase, and be rounded off at the point, and made as smooth as possible; the perforation or hole through the pipe may be made sufficiently large, so as to admit the end of a common funnel, for pouring in the liquor into the bag. By the flexibility of the bladder at the end of this instrument, no danger can happen to the horse; the clyster is conveyed so far up into the intestines that it will be retained; it causes no surprise (providing the liquor be neither too hot nor too cold, but milk warm), as no other force is required to throw it up than the holding the bag a little higher than the level of the pipe; by which means the liquor flows gently into the gut, without any surprise to the horse. After using the bag, it may be blown full of wind, a cork put into the pipe, and hung up in some dry place to prevent it from rotting; by which means it will last a considerable time.

Clysters are distinguished by different names, which denote the quality of the ingredients of which they are composed, as emollient, laxative, diuretic, anodyne, &c. As the more general use of clysters, in the practice of farriery, would be attended with the most salutary effects, especially in acute diseases, where the speediest assistance is necessary, we shall here subjoin some forms of recipes for composing them, together with the cases in which they may be administered with advantage.

1. *Emollient clyster.* Two or three quarts of thin water-gruel, salad oil and coarse sugar, of each six ounces. Dissolve the sugar in the water-gruel, then add the salad oil—Give it milk warm.
2. *Laxative clyster.* Two or three quarts of thin water-gruel, Glauber's salts eight ounces, salad oil six ounces.

When Glauber's salts are not at hand, common salt may be used in its stead.

A great variety of recipes might be added for making clysters, composed of the infusion of different herbs, seeds, &c. But the above ingredients are always easily got; and they will be found to answer all the intentions required under this head, which is to soften the hardened excrements, to lubricate the intestines, and, by exciting a gentle stimulus, promote a free discharge of their contents; which, when once obtained, seldom fails of giving relief in inflammatory cases, spasms, &c.

3. *Purging clyster.* Infuse two ounces of senna in two quarts of boiling water; strain it off; then add syrup of buckthorn and common oil, of each four ounces.

This clyster will operate more briskly than the former, and, on that account, may be preferred when an immediate or speedy discharge is necessary.

4. *Anodyne clyster.* The jelly of starch, or infusion of linseed, one pint; liquid laudanum, one ounce or about two table spoonfuls.

When there is reason to apprehend inflammation in the bowels, opium may be given in place of laudanum, from 20 to 30 grains, in proportion to the urgency of the symptoms; it ought to be well triturated or rubbed

Clysters.

Clysters.

bed in a mortar, with a little of the liquid, till it has thoroughly dissolved. The smallness of the quantity of liquid here recommended, gives it the better chance of being the longer retained, as the good effects to be derived from the opium depend entirely on this circumstance. This clyster is proper to be given in violent gripings, attended with purging, in order to blunt the sharpness of the corroding humours, and to allay the pain usually attending in such cases. The starch will in some measure supply the deficiency of the natural mucus, or covering of the intestines, which has been carried off by violent purging. It may be repeated, if the symptoms continue violent, only diminishing the quantity of laudanum or of the opium.

5. *Nourishing clyster.* Thick water-gruel three quarts.

When clysters of this kind are found necessary, they may be given four or five times in the day, according as circumstances may require; they are of considerable service in cases where the horse cannot eat sufficiently to support him, or swallow any thing, from inflammation of the throat, jaws, &c. or in convulsions, attended with a locked jaw, &c.

6. *Diuretic clyster.* Venice turpentine two ounces; Castile soap one ounce. Dissolve the soap in two quarts of warm water; then add the turpentine, after it has been well beat up with the yolks of two eggs.

This diuretic clyster is of great use in the strangury, and obstructions in the urinary passages; and as it is immediately applied to the parts affected, it seldom fails of giving relief, and has a much better effect when prescribed in this manner than when given by the mouth: by this last way it mixes with the whole mass of fluids, and may lose a considerable portion of its diuretic quality before it reaches the kidneys; but, by being administered in the form of a clyster, it is readily absorbed by the neighbouring vessels, and promotes a free discharge of urine.

It would be needless to add more forms of clysters, as those abovementioned will answer most cases, without any material alteration, but what may be easily supplied by the judicious practitioner.

There are a variety of cases where clysters may be administered with great success, besides those already hinted at; as in inflammatory fevers, spasmodic constrictions, and cholicky complaints in the bowels; in recent coughs, apoplexy, convulsions, paralytic complaints, or swelling of the belly whether from air pent up in the bowels or from hardened excrements; in cases where horses are troubled with worms, as the ascarides which lodge in the lower parts of the intestines, or when bott-worms are observed sticking in the anus, or voided with the dung: in very costive habits, before laxative or opening medicines are given by the mouth; in wounds, which penetrate deep into the muscular or tendinous parts, or in the belly, &c. in inflammations of the eyes, or when the head seems particularly affected; in inflammatory swellings on any part of the body, when a horse cannot swallow any food, &c. whether it proceeds from spasm in the muscles of the throat, inflammations, or swellings. Clysters composed of mucilaginous substances, as starch, linseed, &c. are of great benefit in violent diarrhoeas or looseness, whether it proceeds from a natural discharge, or from too strong purging medicines.

It ought always to be remembered, that clysters should be repeated frequently, till such time as the disorder for which they are given is either removed or greatly abated. This injunction may be the more readily complied with, as the administering clysters to horses is not attended either with much trouble or disturbance to them.

SECT. V. *Rowel and Setons.**

* From the same.

I. ROWELS for horses, answer the same purpose as issues in the human body. The method of introducing them is by making an incision through the skin, about three-eighths of an inch long, and then separating the skin from the flesh with the finger, or with a blunt horn, all round the orifice, as far as the finger will easily reach; then introducing a piece of leather, very thin, shaped round, about the size of a crown piece, having a large round hole in the middle of it. Previous to introducing the leather, it should be covered with lint or tow, and dipped into some digestive ointment; a pledget of tow, dipped in the same ointment, should likewise be put into the orifice, in order to keep out the cold air: the parts around it soon swell, which is followed with a plentiful discharge, from the orifice, of yellow serum or lymph; and, in two or three days at most, the discharge turns into thick gross white matter: the rowel is then said to suppurate.

These artificial vents act by revulsion or derivation; and hence they become of great use in many cases, as they empty the surrounding vessels by a regular slow discharge of their contents, and are even of great service when there is a redundancy or fulness of humours in general, which may require a gradual discharge, in preference to greater evacuations by purging medicines, &c. Rowels should be placed (especially in some particular cases) as near the affected part as possible; and, at all times, they ought to have a depending orifice, in order to admit of a free discharge of the matter that may be contained in them.

The parts where they ought to be inserted, and where they are found to answer best, are the belly, inside of the thighs, the breast, and outside of the shoulders and hips; they are sometimes, but very injudiciously, put in between the jaw-bones under the root of the tongue, where they never come to a proper suppuration, on account of the constant motion of the parts in eating, &c. neither do they answer any good purpose from being placed in that situation. In some disorders it is found necessary to put in several of them at once, in order to make a sudden revulsion from the parts affected: but this should be determined by the horse's age, strength, and circumstances that require them.

But though rowels are found very beneficial in some cases, yet, like a number of other operations common to horses, they sometimes, by the improper use of them, become hurtful to the constitution; and, in some diseases, they frequently, instead of suppurating, turn gangrenous. Thus, in violent fevers, where they are frequently very improperly applied, they never suppurate properly: whether this proceeds from the quickness of the pulse, together with the violent rapidity with which the fluids in general are then carried through the vessels, or from the violent agitation in which the whole system is thrown,

Rowels and Setons. Rowels and thrown, it is difficult to determine; but experience confirms the observation, when properly attended to. In such cases, the surrounding parts where the rowel is placed, seldom or never swell (as in the ordinary course, when they suppurate properly), but appear dry, or much in the same state as when they were first put in; there is little or no discharge from the orifice; and the little that does come is thin, ichorous, and bloody. In such cases, they ought to be taken out immediately, and the parts well fomented with a strong infusion of camomile, or an emollient poultice applied, if it can be properly fixed, and frequently repeated; at intervals, the parts ought likewise to be bathed with ardent spirits, as that of wine, turpentine, &c. covering the parts from the external air; and provided there is no fever at the time, two or three ounces of Peruvian bark may be given through the day, either made into balls or given in a liquid; and this continued till the threatening symptoms are removed.

Rowels are of great use in carrying off rheums or discharges from the eyes; in great swellings of the glands, &c. about the throat and jaws, which threaten a suffocation; or when the head seems particularly affected, as in the vertigo or staggers, apoplexy, &c. &c.; in recent lameness; swellings of the legs and heels, attended with a discharge of thin ichorous matter, &c.; in large and sudden swellings in any part of the body; or when extravasations of the fluids have taken place, from blows, bruises, &c. or when a horse has had a severe fall, &c. and in a variety of other cases, which will occur to the judicious practitioner.

2. Setons are of great use in carrying off matter from deep seated tumours or abscesses in different parts of the body. They ought all times to be used in preference to making deep incisions into the muscular parts, which not only disfigure horses, but such deep incisions are very difficult to heal up in them, on account of the situation of some of these tumours, and the horizontal position of the body, which is unfavourable in many cases for procuring a depending opening in order to carry off the matter, as in tumors on the back, withers, and upper part of the neck immediately behind the ears, which are very common. Besides the horizontal position of the body, the natural restlessness and impatience of horses renders it impracticable to fix proper bandages on those elevated parts; the situation of them likewise will not admit of proper dressings being fixed on them with any degree of certainty of their remaining for any length of time; by which means the openings made into such tumors or abscesses are frequently left bare, and exposed to the cold air, &c.: hence such openings degenerate into very foul ulcers, and produce a great deal of proud flesh, and which require to be repeatedly cut away with the knife, as the strongest caustics that can be applied are not sufficient to keep it under.

Setons are introduced by long, thin, sharp-pointed instruments or needles, shaped like a dart at the point, and having at the other extremity an eye to receive the end of the cord, which is to be left in the tumor. The size of the instrument may be determined by that of the tumor, and the thickness of the cord which is to follow it, and which at all times ought to be smaller than the perforation made by the point of the needle. Every practitioner in farriery should always have a

number of these needles by him, of different sizes, that is, from 6 to 14 or 15 inches long, a little bended on the flat or under side. The following is the method of applying them in cases of tumors, &c. When the matter is found to fluctuate in the tumor, the needle, armed with a cord at the other end, is to be introduced at the upper part of it, and the sharp point of the instrument directed to, and brought out at the under or lowermost part of the tumor, including the whole length of it; or, if needful, through the sound muscular flesh on the under part, in order to make a depending orifice for the matter to run freely off; the cord should be dipped in some digestive ointment, and then tied together at both ends with a thread, in order to prevent its slipping out. But if, from the length of the perforation, the cord should not admit of being tied together at the ends, a small button of wood, or some such substance, may be fixed at each end; only, from this circumstance, the cord will require, when shifted, occasionally to be drawn upwards and downwards; whereas, when the ends of it are tied together, it forms a circle, and may always be shifted downwards to the lower orifice. When the matter in the tumor appears to be wholly discharged or dried up, and no thickness appearing but where the cord is, it may then be cut out, and the orifices suffered to heal up.

When the needle for introducing the seton is to pass near any large blood-vessels or nerves; in order to prevent the chance of their being wounded, it may be concealed in a canula or case, open at both ends; and after an opening is made at the upper part of the tumor sufficient to admit the needle with its case, it may then be directed with safety to pass the blood-vessels, &c. it may then be pushed forward through the canula and the opposite side of the tumor, and having only the common teguments to perforate, all danger will be avoided.

SECT. VI. *Of Alterative Medicines.*

By alteratives, or altering medicines, are to be understood such as, having no immediate sensible operation, gradually gain upon the constitution, by changing the humours or juices from a state of distemperance to health. This intention in some cases may perhaps be effected by correcting the acrimony of the juices, and accelerating the blood's motion; and in others by attenuating or breaking its particles, and dividing those cohesions which obstruct the capillaries or finer vessels, and so promote the due secretions of the various fluids. It is certain, that many have but an indifferent opinion of a medicine that does not operate externally, and gratify their senses with a quantity of imagined humours ejected from the body: but let such people remember, that there are good humours as well as bad which are thrown off together; that no evacuating medicine has a power of selecting or separating the bad from the good; and consequently that they are thrown out only in a proportionate quantity. These few hints may be sufficient to convince the judicious reader of the great advantages arising from alteratives, and the preference due to them in most cases over purgatives; unless it could be proved, as already mentioned, that the latter could cull out and separate from the blood the bad humours solely, leaving the good behind; but this

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this selective power has long been justly exploded as ridiculous and uncertain; since it is plain, that all kinds of purging medicines differ only in degree of strength, and operate no otherwise upon different humours than as they stimulate more or less.

We shall therefore take this opportunity of recommending some alterative medicines which are not so generally known as they ought to be; and that too on the surest grounds, a proper experience of their good effects in repeated trials. The first, then, is nitre or purified salt-petre; which has long been in great esteem, and perhaps is more to be depended on in all inflammatory fevers than any other medicine whatever: but besides this extensive power of allaying inflammatory disorders, it is now offered as an alterative remedy, taken in proper quantities for surfeits, molten grease, hide-bound, grease-heels, &c. And as it has been known to succeed even in the cure of the farcy; what other distempers in horses, arising from vitiated fluids, may it not be tried on, with a strong probability of success? This great advantage will arise from the use of this medicine over most others, that, as its operation is chiefly by urine, it requires no confinement or cloathing; but the horse may be worked moderately throughout the whole course. This medicine has been found equally efficacious (by many trials made in one of our hospitals) in correcting the acrimony of the juices, and disposing the most obstinate and inveterate sores to heal up; and hence probably it came recommended as an alterative to our horses.

The quantity of nitre given at a time should be from two to three ounces a-day; let it be finely powdered, and then mix with it by little at a time as much honey as will form it into a ball: give it every morning fasting for a month; or it may be given at first for a fortnight only, intermitting a fortnight, and then repeat it. If it be observed that the horse shows an uneasiness at the stomach after taking it, a horn or two of any liquor should be given after it, or it may be dissolved at first in his water, or mixed with his corn; though the ball, where it agrees, is the easiest method of giving.

When horfesteake drinks with great reluctance, powders must be given in their feeds: thus crude antimony, or liver of antimony finely powdered, may be given to the quantity of half an ounce, night and morning; but in all surfeits, gum guaiacum mixed with antimony is found more efficacious. Thus,

TAKE of crude antimony finely powdered, or, where it can be afforded, cinnabar of antimony, and gum guaiacum, of each a pound: mix together with an oily pestle to prevent the gum's caking: divide the whole into 32 doses, viz. an ounce each dose: let one be given every day in the evening-feed.

Or, TAKE of cinnabar of antimony, gum guaiacum, and Castile or Venice soap, of each half a pound; salt of tartar, four ounces: beat them up into a mass, and give an ounce every day. To these may be added very advantageously an ounce and an half of camphor.

Æthiops mineral, given to the quantity of half an ounce a day, is a very good sweetener and corrector of the blood and juices; but it has been observed, after having been taken a week or ten days, to make some horses flabby, and unable to chew their hay and oats;

and the same symptoms have arisen, where only two drams of crude mercury has been given, and continued about the same space of time.

Diet-drinks—1. A decoction of logwood, prepared like that of guaiacum, is also successfully given in surfeits.

2. Lime-water prepared with shavings of saffra and liquorice, is a good diet-drink to sweeten and correct a horse's blood; and may be given with the nitre-balls for that purpose.

3. Tar-water also, may in many cases be well worth trial: but let it be remembered, that all medicines of this kind should be continued a considerable time in obstinate cases.

SECT. VII. Of Colds.

By taking cold, we mean that the pores and outlets of the skin (which in a natural healthy state of body are continually breathing out a fine fluid, like the steam arising from hot water, or smoke from fire) are so far shut up, that these steams, or perspirable matter, not having a free passage through them, are hindered from going off in the usual manner; the consequence of which is, their recoiling on the blood, vitiating its quality, overfilling the vessels, and affecting the head, glands or kernels of the neck and throat, the lungs, and other principal parts.

To enumerate the various causes of colds would be endless: the most usual are, riding horses till they are hot, and suffering them to stand in that condition where the air is cold and piercing; removing a horse from a hot stable to a cold one, and too suddenly changing his cloathing; whence it is that horses often catch such severe colds after they come out of dealers hands, and by not being carefully rubbed down when they come in hot off journies.

Where there is a constant attention and care, the effects of cold are not only soon discovered, but an observation may be very early made to what part it more immediately directs its attack. For instance, if the nervous system be the most irritable, the affection is quickly perceived in the eyes; if the glandular, upon the neck, throat, under the ears, or in the head: or if more particularly the system of circulation has been affected, the consequences are soon apparent upon the lungs: and will be exerted more or less in a cough, or difficulty of breathing, according to the severity of attack, from the repulsion of perspirable matter, and its consequent absorption into the circulation. As soon as the horse is in this state, a symptomatic fever attends; which is to be understood as no more than a degree of febrile heat or irritability dependant on the original cause, which gradually ceases as the primary disease is found to decline.

From an affection of the different parts above specified, various disorders ensue, which are treated of under their proper heads. Here we have only to consider that kind of cold fixed on the lungs, which produces cough; and which, if taken in its first stage, generally yields to very simple remedies.

As soon as the attack has been observed, bleeding should be instantly performed, according to symptoms, size, state, and condition; and the blood preserved a few hours to ascertain its state: if livid or black, with

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with a coat of size upon its surface, there is no doubt of its viscosity, and of the obstructed circulation of that fluid through the finer vessels of the lungs. In three or four hours after bleeding, give a mash prepared as follows:

TAKE of bran and oats, equal parts. Pour on boiling water a sufficient quantity: then stir in aniseed and liquorice powders, each one ounce; honey, four ounces. In two hours after the mash give a gallon or six quarts of soft water moderately warm, in which has been dissolved two ounces of nitre.

These mashes Mr Taplin directs to be "continued every night and morning, giving a moderate feed of dry oats in the middle of the day, good sweet hay in small quantities, and the same proportion of nitre to be repeated in the water after each mash. To these must be added the necessary regulations of good dressing and gentle exercise, which in general soon effect the cure of such colds as are counteracted upon the first attack."

To humour those who are not satisfied without some formal compositions, the following may be exhibited when the fever does not run high.

Pectoral Horse-ball. TAKE of the fresh powders of aniseed, elecampane, carraway, liquorice, turmeric, and flour of brimstone, each three ounces; juice of liquorice four ounces, dissolved in a sufficient quantity of mountain; saffron powdered half an ounce, salad-oil and honey half a pound, oil of aniseed one ounce: mix them together with wheat-flour enough to make them into a paste.

Or the following from Dr Bracken.

TAKE aniseed, carraway seed, and greater cardamoms, finely powdered, of each one ounce, flour of brimstone two ounces, turmeric in fine powder one ounce and a half, saffron two grains, Spanish juice dissolved in water two ounces, oil of aniseed half an ounce, liquorice powder one ounce and a half, wheat-flower a sufficient quantity to make into a stiff paste by beating all the ingredients well in a mortar.

These balls consist of warm opening ingredients: and, given in small quantities, about the size of a pullet's egg, will encourage a free perspiration.

To a horse loaded with flesh, a rowel may sometimes be necessary, as may also a gentle purge or two to some when the distemper is gone off.

When the disorder has been neglected, and made a rapid progress, should the cough be violent and constant, the horse very dull and refusing his food, and the symptomatic fever run high, the blood will consequently prove as before described. In this case the symptoms will not perhaps yield to the above plan so soon as may be wished. It will therefore be necessary to repeat the bleeding in two or three days at farthest, according to circumstances. The mashes may at the same time be altered to equal parts of malt and bran, scalded with boiling water; into which, when nearly cool, enough for the manger, stir elecampane, aniseed and liquorice powders, each one ounce: this mash to be repeated every night and morning: continuing also the noon-feed dry, and the nitre two ounces in the water, as before directed. By a due attention to these measures, relief will soon be obtained, and a cure generally effected in the course of a few days: Whereas,

by delay or neglect, a confirmed cough, asthma, broken-wind, or consumption, may be the consequence.

Fever in general.

SECT. VIII. Of Fevers in general.

I. THE symptoms of a fever are, Great restlessness; the horse ranging from one end of his rack to the other; his flanks beat; his eyes are red and inflamed; his tongue parched and dry; his breath is hot, and smells strong; he loses his appetite, and nibbles his hay, but does not chew it, and is frequently smelling to the ground; the whole body is hotter than ordinary (though not parched, as in some inflammatory disorders); he dungs often, little at a time, usually hard, and in small bits; he sometimes stales with difficulty, and his urine is high-coloured; and he seems to thirst, but drinks little at a time and often; his pulse beats full and hard, to 50 strokes and upwards in a minute.

The first intention of cure is bleeding, to the quantity of two or three quarts, if the horse is strong and in good condition: then give him a pint of the following drink, four times a-day; or an ounce of nitre, mixed up into a ball with honey, may be given thrice a-day instead of the drink, and washed down with three or four horns of any small liquor.

TAKE of baum, sage, and camomile-flowers, each a handful, liquorice-root sliced half an ounce, salt prunel or nitre three ounces; infuse in two quarts of boiling water; when cold, strain off, and squeeze into it the juice of two or three lemons, and sweeten with honey.

As the chief ingredient to be depended on in this drink is the nitre, it may perhaps be as well given in water alone; but as a horse's stomach is soon palled, and he requires palatable medicines, the other ingredients may in that respect have their use. Soleysel for this purpose advises two ounces of salt of tartar, and one of sal ammoniac, to be dissolved in two quarts of water, and mixed with a pail of common water, adding a handful of bran or barley-flour to qualify the unpleasant taste: this may be given every day, and is a useful medicine.

His diet should be scalded bran, given in small quantities; which if he refuses, let him have dry bran sprinkled with water: put a handful of pickled hay into the rack, which a horse will often eat when he will touch nothing else; his water need not be much warmed, but should be given often and in small quantities: his cloathing should be moderate; too much heat and weight on a horse being improper in a fever, which scarce ever goes off in critical sweats (as those in the human body terminate), but by strong perspiration.

If in a day or two he begins to eat his bran and pick a little hay, this method with good nursing will answer; but if he refuses to feed, more blood should be taken away, and the drinks continued; to which may be added two or three drams of saffron, avoiding at this time all hotter medicines: the following glyster should be given, which may be repeated every day, especially if his dung is knotty or dry.

TAKE two handfuls of marshmallows, and one of camomile flowers; fennel-seed an ounce; boil in three quarts of water to two; strain off, and add four

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four ounces of treacle, and a pint of linseed oil or any common oil.

Two quarts of water-gruel, fat broth, or pot-liquor, with the treacle and oil, will answer this purpose; to which may be added a handful of salt. These sorts of glysters are more proper than those with purging ingredients.

The following opening drink is very effectual in those fevers; and may be given every other day, when the glysters should be omitted; but the nitre-balls or drink may be continued, except on those days these are taken.

TAKE of cream of tartar and Glauber's salts, each four ounces; dissolve in barley-water, or any other liquor: an ounce or two of lenitive electuary may be added, or a dram or two of powder of jalap, to quicken the operation in some horses.

Four ounces of Glauber's salts, or cream of tartar, with the same quantity of lenitive electuary, may be given for the same purpose, if the former should not open the body sufficiently.

In four or five days the horse generally begins to pick his hay, and has a seeming relish for food; tho' his flanks will heave pretty much for a fortnight: yet the temper of his body and return of appetite show, that nothing more is requisite to complete his recovery than walking him abroad in the air, and allowing plenty of clean litter to rest him in the stable.

This method of treating a fever is simple, according to the laws of nature; and is confirmed by long experience to be infinitely preferable to the hot method.

The intention here is to lessen the quantity of blood, promote the secretion of urine and perspiration, and cool and dilute the fluids in general.

2. There is another sort of fever that horses are subject to, of a more complicated and irregular nature than the former; which, if not properly treated, often proves fatal.

The signs are, A slow fever, with languishing, and great depressions; the horse is sometimes inwardly hot, and outwardly cold; at other times hot all over, but not to any extreme; his eyes look moist and languid: he has a continual moisture in his mouth, which is the reason he seldom cares to drink, and when he does, it is but little at a time. He feeds but little, and leaves off as soon as he has eat a mouthful or two; he moves his jaws in a feeble loose manner, with an unpleasant grating of his teeth; his body is commonly open; his dung soft and moist, but seldom greasy; his staling is often irregular, sometimes little, at other times profuse, seldom high-coloured, but rather pale, with little or no sediment.

When a horse's appetite declines daily, till he refuses all meat, it is a bad sign. When the fever doth not diminish, or keep at a stand, but increases, the case is then dangerous. But when it sensibly abates, and his mouth grows drier, the grating of his teeth ceases, his appetite mends, and he takes to lie down (which perhaps he has not done for a fortnight), these are promising signs. A horse in these fevers always runs at the nose, but not the kindly white discharge, as in the breaking of a cold, but of a reddish or greenish dusky colour, and of a consistence like glue, and sticks like turpentine to the hair on the inside of the nostrils: If this turns to a gleet of clear thin water, the horse's

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hide keeps open, and he mends in his appetite; these are certain signs of recovery.

The various and irregular symptoms that attend this slow fever, require great skill to direct the cure, and more knowledge of the symptoms of horses diseases than the generality of gentlemen are acquainted with. The experienced farrier should therefore be consulted and attended to, in regard to the symptoms; but very seldom as to the application of the remedy, which is generally above their comprehension; though it may be readily selected, by duly attending to the observations here inculcated.

First, then, a moderate quantity of blood, not exceeding three pints, may be taken away, and repeated in proportion to his strength, fullness, inward soreness, cough, or any tendency to inflammation. After this, the fever-drink first abovementioned may be given, with the addition of an ounce of snake-root, and three drams of saffron and camphor dissolved first in a little spirit of wine; the quantity of the nitre may be lessened, and these increased as the symptoms indicate.

The diet should be regular; no oats given, but scalded or raw bran sprinkled; the best flavoured hay should be given by handfuls, and often by hand, as the horse sometimes cannot lift up his head to the rack.

As drinking is so absolutely necessary to dilute the blood, if the horse refuses to drink freely of warm water or gruel, he must be indulged with having the chill only taken off by standing in the stable: nor will any inconvenience ensue, but oftener an advantage; for the nauseous warmth of water, forced on horses for a time, palls their stomachs, and takes away their appetites, which the cold water generally restores.

Should the fever after this treatment increase, the horse feed little, stale often, his urine being thin and pale, and his dung sometimes loose, and at other times hard; should the moisture in his mouth continue, his skin being sometimes dry and at others moist, with his coat looking starting and surfeited: upon these irregular symptoms, which denote great danger, give the following balls, or drink; for in these cases there is no time to be lost.

TAKE of contrayerva-root, myrrh, and snake-root, powdered, each two drams; saffron one dram, mithridate or Venice treacle half an ounce; make into a ball with honey, which should be given twice or thrice a-day, with two or three horns of an infusion of snake-root sweetened with honey; to a pint and a half of which may be added half a pint of treacle-water or vinegar, which latter is a medicine of excellent use in all kinds of inflammatory and putrid disorders, either external or internal.

Should these balls not prove successful, add to each a dram of camphor, and, where it can be afforded, to a horse of value, the same quantity of castor. Or the following drink may be substituted in their stead for some days.

TAKE contrayerva and snake-root of each two ounces, liquorice-root one ounce, saffron two drams; infuse in two quarts of boiling water close covered for two hours; strain off, and add half a pint of distilled vinegar, four ounces of spirit of wine, wherein half an ounce of camphor is dissolved, and two ounces of mithridate or Venice treacle;

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treacle; give a pint of this drink every four, six, or eight hours.

Should the horse be costive, recourse must be had to glysters, or the opening drink: should he purge, take care not to suppress it, if moderate; but if, by continuance, the horse grows feeble, add diascordium to his drinks, instead of the mithridate; if it increases, give more potent remedies.

Let it be remembered, that camphor is a very powerful and effectual medicine in these kinds of putrid fevers; being both active and attenuating, and particularly calculated to promote the secretions of urine and perspiration.

Regard should also be had to his staling; which if in too great quantities, so as manifestly to depress his spirits, should be controlled by proper refrigerants, or by preparing his drinks with lime-water. If, on the contrary, it happens that he is too remiss this way, and stales so little as to occasion a fulness and swelling of the body and legs, recourse may be had to the following drink:

TAKE of salt prunella, or nitre, one ounce; juniper-berries, and Venice turpentine, of each half an ounce: make into a ball with oil of amber.

Give him two or three of these balls, at proper intervals, with a decoction of marsh-mallows sweetened with honey.

But if, notwithstanding the method we have laid down a greenish or reddish gleet is discharged from his nostrils, with a frequent sneezing; if he continues to lose his flesh, and becomes hide-bound; if he altogether forsakes his meat, and daily grows weaker; if he swells about the joints, and his eyes looked fixed and dead; if the kernels under his jaws swell, and feel loose: if his tail is raised, and quivers; if his breath smells strong, and a purging ensues with a discharge of fetid dark-coloured matter; his case may then be looked on as desperate, and all future attempts to save him will be fruitless.

The signs of a horse's recovery are known by his hide keeping open, and his skin feeling kindly; his ears and feet will be of a moderate warmth, and his eyes brisk and lively; his nose grows clean and dry; his appetite mends, he lies down well, and both stales and dungs regularly.

Be careful not to overfeed him on his recovery: let his diet be light, feeds small, and increased by degrees as he gets strength; for, by overfeeding, horses have frequent relapses or great surfeits, which are always difficult of cure.

If this fever should be brought to intermit, or prove of the intermitting kind, immediately after the fit is over give an ounce of Jesuit's bark, and repeat it every six hours till the horse has taken four or six ounces: should eruptions or swellings appear, they ought to be encouraged; for they are good symptoms at the decline of a fever, denote a termination of the distemper, and that no further medicines are wanted.

The true reasons, perhaps, why so many horses miscarry in fevers, are, that their masters, or doctors, will not wait with patience, and let nature have fair play; that they generally neglect bleeding sufficiently at first; and are constantly forcing down sugar-sops, or other food, in a horn, as if a horse must be starved in a few days if he did not eat: then they ply him twice or

thrice a-day with hot medicines and spirituous drinks, which (excepting a very few cases) must be extremely pernicious to a horse, whose diet is naturally simple, and whose stomach and blood, unaccustomed to such heating medicines, must be greatly injured, and without doubt are often inflamed by such treatment.

Dilute the blood with plenty of water, or white drink: let his diet be warm bran-mashes, and his hay sprinkled. Should the fever rise, which will be known by the symptoms above described, give him an ounce of nitre thrice a-day in his water, or made up in a ball with honey. Let his body be kept cool and open, with the opening drink, given twice or thrice a-week; or an ounce of salt of tartar may be given every day, dissolved in his water, for that purpose, omitting then the nitre. After a week's treatment in this manner, the cordial ball may be given once or twice a-day, with an infusion of liquorice-root sweetened with honey; to which may be added, when the phlegm is tough, or cough dry and husky, a quarter of a pint of linseed or salad oil, and the same quantity of oxymel squills.

This following cooling purge is very proper to give at the decline of the distemper, and may be repeated three or four times.

TAKE two ounces of senna, aniseed and fennelbruised each half an ounce; salt of tartar three drams; let them infuse two hours in a pint of boiling water; strain off, and dissolve in it three ounces of Glauber's salt, and two of cream of tartar; give for a dose in the morning.

The purge generally works before night very gently; and in fevers, and all inflammatory disorders, is infinitely preferable to any other physic.

Before we close this section on fevers, it may be no improper hint to the curious, to take notice, that a horse's pulse should more particularly be attended to than is customary, as a proper estimate may thereby be made both of the degree and violence of the fever present, by observing the rapidity of the blood's motion, and the force that the heart and arteries labour with to propel it round. The highest calculation that has been made of the quickness of the pulse in a healthy horse, is, that it beats about 40 strokes in a minute; so that in proportion to the increase above this number, the fever is rising, and if farther increased to above 50 the fever is very high.

How often the pulse beats in a minute may easily be discovered by measuring the time with a stop-watch or minute sand-glass, while your hand is laid on the horse's near side, or your fingers on any artery those which run up on each side the neck are generally to be seen beating, as well as felt a little above the chest; and one within side each leg may be traced with the finger.

A due attention to the pulse is so important an article, in order to form a proper judgment in fevers, that it would appear amazing it has so much been neglected, if one did not recollect, that the generality of farriers are so egregiously ignorant, that they have no manner of conception of the blood's circulation, nor in general have they ability enough to distinguish the difference between an artery and a vein.—With such pretty guardians do we intrust the healths and lives of the most valuable of animals!

*Fevers in
General.*

Pleurisy, Inflammation of the Lungs, &c. SECT. IX. *Of a Pleurisy, and an Inflammation of the Lungs, &c.*

1. THESE disorders have scarce been mentioned by any writer on farriery before Mr Gibson; who, by frequently examining the carcases of dead horses, found them subject to the different kinds of inflammations here described.

In order to distinguish these disorders from others, we shall describe the symptoms in Mr Gibson's own words.

"A pleurisy, then, which is an inflammation of the pleura; and a peripneumony, which is an inflammation of the lungs; have symptoms very much alike; with this difference only, that in a pleurisy a horse shows great uneasiness, and shifts about from place to place; the fever, which at first is moderate, rises suddenly very high; in the beginning he often strives to lie down, but starts up again immediately, and frequently turns his head towards the affected side, which has caused many to mistake a pleuritic disorder for the gripes, this sign being common to both, though with this difference: in the gripes, a horse frequently lies down and rolls; and, when they are violent, he will also have convulsive twitches, his eyes being turned up, and his limbs stretched out, as if he were dying; his ears and feet are sometimes occasionally hot, and sometimes as cold as ice; he falls into profuse sweats, and then into cold damps; strives often to stale and dung, but with great pain and difficulty; which symptoms generally continue till he has some relief: but, in a pleurisy, a horse's ears and feet are always burning hot, his mouth parched and dry, his pulse hard and quick: even sometimes, when he is nigh dying, his fever is continued and increasing; and though in the beginning he makes many motions to lie down, yet afterwards he reins back as far as his collar will permit, and makes not the least offer to change his posture, but stands panting with short stops, and a disposition to cough, till he has some relief, or drops down.

"In an inflammation of the lungs, several of the symptoms are the same; only in the beginning he is less active, and never offers to lie down during the whole time of his sickness; his fever is strong, breathing difficult, and attended with a short cough: and whereas, in a pleurisy, a horse's mouth is generally parched and dry; in an inflammation of the lungs, when a horse's mouth is open, a ropy slime will run out in abundance; he gleans also at the nose a reddish or yellowish water, which sticks like glue to the inside of his nostrils.

"In a pleurisy, a horse heaves and works violently at his flanks, with great restlessness, and for the most part his belly is tucked up: but in an inflammation of the lungs, he always shows fulness; the working of his flanks is regular, except after drinking and shifting his posture; and his ears and feet are for the most part cold, and often in damp sweats."

2. The cure of both these disorders is the same. In the beginning a strong horse may lose three quarts of blood, the next day two quarts more; and, if symptoms do not abate, the bleedings must be repeated, a quart at a time; for it is speedy, large, and quick-repeated bleedings that are in these cases chiefly to be depended on. But if a horse has had any previous weak-

ness, or is old, you must bleed him in less quantities, and oftener. Mr Gibson recommends rowels on each side the breast, and one on the belly; and a blistering ointment to be rubbed all over his brisket upon the foremost ribs.

The diet and medicines should be both cooling, attenuating, relaxing, and diluting. After the operation of bleeding, therefore, Mr Taplin * directs "to * Gentle- have ready some bran and very sweet hay cut small, and scalded together; which place hot in the manger, that the fumes may be imbibed as an internal fomentation to relax the rigidity of the glands, and excite a discharge from the nostrils so soon as possible. The very nature of this case, and the danger to which the horse is exposed, sufficiently point out the propriety and consistency of exerting all possible alacrity to obtain relief, or counteract the disease in its first stage: therefore let the fumigation of scalded bran and hay be repeated every four or five hours, and the following decoction prepared without delay:

"PEARL barley, raisins split, and Turkey figs sliced, each six ounces; stick liquorice bruised, two ounces. Boil these in a gallon of water till reduced to three quarts; strain off; and, while hot, stir in one pound of honey, and, when cold, a pint of distilled vinegar; giving an ounce of nitre in a pint of this decoction every four, five, or six hours, according to the state and inveteracy of the disease.

"If relief is not obtained so soon as expected, and the horse is colicive, give a glyster, with

"Two quarts of common gruel; coarse sugar six ounces; Glauber salts four ounces; tincture of jalap two ounces; and a quarter of a pint of olive oil. This must be repeated every 24 hours, or oftener, if necessary.

"Should the symptoms still continue violent, without discovering any signs of abatement; after waiting a proper time for the effect of previous administrations, let the bleeding be repeated, in quantity proportioned to the urgency of symptoms, continuing the decoction and nitre every three or four hours, and repeating the glyster if plentiful evacuations have not been obtained by the former injection.

"The diluting drink, before prescribed, is introduced here in preference to a ball, that its medicinal efficacy may be expeditiously conveyed to the seat of disease. So soon as the wished-for advantages are observed, and the predominant and dangerous symptoms begin to subside, when he labours less in respiration, is brisker in appearance, heaves less in the flank, dungs frequently, stales freely, runs at the nose, eats his warm mashes of scalded bran, with four ounces of honey to each, and will drink thin gruel for his common drink (in each draught of which should be dissolved two ounces of cream of tartar); in short, so soon as every appearance of danger is dispelled, the management may be the same as in a common cold; giving one of the following balls every morning for a fortnight, leaving off the mashes and diluting drink by degrees, and varying the mode of treatment as circumstances may dictate.

"CASTILE soap, six ounces; gum ammoniacum, two ounces; anise and cummin seeds (in powder), each four ounces; honey sufficient to form the mass, which divide into a dozen balls.

Pleurisy,
Inflamma-
tion of the
Lungs, &c.

"To prevent any ill effects that may arise from the bad condition of the matter that has so long overloaded the vessels of the lungs, such as the formation of ulcers, knots, or tubercles, the best method will be, so soon as the horse (with great care, gentle exercise, moderate and regular feeding) has recovered in a tolerable degree his natural strength, to put him upon the following gentle course of physic; and it will become more immediately necessary, where the horse bears about him remnants of the distemper, either in a gleet from the nose, rattling in his throat, difficulty of breathing, or heaving in the flanks.

"Socotorine aloes nine drams; rhubarb and jalap each a dram and a half; gum ammoniacum, calomel, and ginger, each a dram; oil of juniper sixty drops; syrup of buckthorn sufficient to make a ball.

"Six clear days or more, if the horse is weak, should be allowed between each dose."

There is also an external pleurisy, or inflammation of the muscles between the ribs, which, when not properly treated, proves the foundation of that disorder called the *chest-founder*; for if the inflammation is not dispersed in time, and the viscid blood and juices so attenuated by internal medicines that a free circulation is obtained, such a stiffness and inactivity will remain on these parts, as will not easily be removed, and which is generally known by the name of *chest-founder*.

The signs of this inflammation, or external pleurisy, are a stiffness of the body, shoulders, and fore-legs; attended sometimes with a short dry cough, and a shrinking when handled in those parts.

Bleeding, soft pectorals, attenuants, and gentle purges, are the internal remedies; and, externally, the parts affected may be bathed with equal parts of spirit of sal ammoniac and ointment of marshmallows or oil of camomile.

These outward inflammations frequently fall into the inside of the fore-leg, and sometimes near the shoulder; forming abscesses, which terminate the disorder.

SECT. X. Of a Cough, and Asthma.

THE consequences of colds neglected or injudiciously treated, are settled habitual coughs, asthmas, broken-wind, and consumption.

Of coughs two are chiefly distinguished. The one is loose, almost continual, and increasing to violence upon the least motion: the other is a short dry cough, preceded by a husky hollow kind of wheezing, as if respiration was obstructed by fragments of hay or corn retained in the passage. This last is the kind of cough called *asthma* by most writers, and for which mercurial purges have been recommended. These, however, Mr Taplin observes, may perhaps be exhibited with more propriety after the administration of a course of the following balls, should they fail in the desired effect. Bleeding must be first performed, and occasionally repeated in small quantities, till the glandular inflammation and irritability are allayed, and the blood so attenuated by the constant use of nitre, as to render the circulation free through the finer vessels of the lungs, from the obstructions in which all the difficulties proceed. Bleeding having taken place with the

necessary circumspection as to quantity, let the two Cough and
ounces of nitre be given punctually every night and Asthma.
morning in the water, as particularized under the article *Colds*, continuing one of the following balls every morning for a fortnight or three weeks, that a fair and decisive trial may be obtained.

Detergent Pectoral Balls—TAKE of Castile soap, aniseed, and liquorice powders, each five ounces; Barbadoes tar, six ounces; gum ammoniacum, three ounces; balsam of Tolu, one ounce; honey (if required) to make a mass; which divide into a dozen balls.

If there should appear no abatement of the symptoms after the above trial, bleeding must be repeated, and mercurials had recourse to. Mr Taplin advises "two doses of mercurial physic to be given eight days apart, and prepared by the addition of a dram and a half of calomel to either of the purging balls (under the articles of purging) best calculated for the horse's strength and condition. After which repeat the above pectoral balls, with the addition of gum myrrh, Benjamin and Venice turpentine, each two ounces; dividing the mass into balls of two ounces each, repeating them every morning till the above proportion (with these additions) are totally consumed."

The other kind, or that long loud hollow cough which is almost incessant, and continually increasing upon the least hurry in exercise, proceeds equally from irritability and the action of the slimy mucus upon the glands in respiration, as well as the viscosity and sluggish motion of the blood through the finer passages; but yields to remedies with much less difficulty than the asthmatic. In this case, as in the other, bleeding must be premised, and followed by a mass compounded of equal parts of bran and oats, into which must be stirred and dissolved, while hot, honey four ounces. This mass must be repeated, with two ounces of nitre in the water, without intermission, every night and morning; giving also every morning the following ball, being an improvement by Mr. Taplin upon the *cordial ball* of Braken.

TAKE Turkey figs, Spanish liquorice, aniseed, and liquorice powders, each four ounces; caraway seeds, elecampane, and anisated balsam, each two ounces; saffron, ginger (in powder), and oil of aniseed, each six drachms; honey sufficient to form the mass; and divide into twelve balls; of which let one be given every morning.

The figs and saffron are to be beat to a paste in the mortar previous to their incorporation with the other articles, the Spanish liquorice is to be softened over the fire by boiling in a small quantity of spring-water, and the whole of the ingredients mixed in a proper manner. "These balls (says our author) are powerfully cordial and restorative; they promote glandular excretion, warm and stimulate the stomach to the expulsion of wind, enliven the circulation, and invigorate the whole frame, as has been sufficiently ascertained by their instantaneous effect in the chase, where their excellence has been repeatedly established; but more particular in deep swampy countries, when, after a severe burst, or a repetition of strong leaps, the horse has been so off his wind, or in fact, nature so exhausted, as not to be able to proceed a stroke farther; the immediate administration of a single ball has not only afforded instant

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Wind.

stant relief, but the horse gone through the day with his usual alacrity."

Before closing this section, it may be necessary to observe, that young horses are subject to coughs on cutting their teeth; their eyes also are affected from the same cough. In these cases always bleed; and if the cough is obstinate, repeat it, and give warm mashes; which, in general, are alone sufficient to remove this complaint.

SECT. XI. *Of a Broken Wind.*

THIS disorder, Mr Gibson is inclined to think, frequently originates from injudicious or hasty feeding of young horses for sale; by which means the growth of the lungs, and all the contents within the chest, are so increased, and in a few years so preternaturally enlarged, that the cavity of the chest is not capacious enough for them to expand themselves in and perform their functions.

A narrow contracted chest with large lungs may sometimes naturally be the cause of this disorder: and it has been observed, that horses rising eight years old are as liable to this distemper, as, at a certain period of life, men are to fall into asthmas, consumptions, and chronic diseases.

The reason why it becomes more apparent at this age, may be, that a horse comes to his full strength and maturity at this time; at six, he commonly finishes his growth in height; after that time he lets down his belly and spreads, and all his parts are grown to their full extent; so that the pressure on the lungs and midriff is now more increased.

But how little weight soever these reasons may have, repeated dissections have given ocular proofs of a preternatural largeness, not only of the lungs of broken-winded horses, but of their heart and its bag, and of the membrane which divides the chest; as well as of a remarkable thinness in the diaphragm or midriff. This disproportion has been observed to be so great, that the heart and lungs have been almost of twice their natural size, perfectly sound, and without any ulceration whatever, or any defect in the wind-pipe or its glands. Hence it appears, that this enormous size of the lungs, and the space they occupy, by hindering the free action of the midriff, is the chief cause of this disorder: and as the substance of the lungs was found more fleshy than usual, they of course must lose a great deal of their spring and tone.

Whoever considers a broken-wind in this light, must own that it may be reckoned among the incurable distempers of horses; and that all the boasted pretensions to cure are vain and frivolous, since the utmost skill can amount to no more than now and then palliating the symptoms, and mitigating their violence.

We shall therefore only lay down such methods as may probably prevent this disorder, when pursued in time. But if they should not succeed, we shall offer some remedies and rules to mitigate its force, and make a horse as useful as possible under this malady.

It is usual, before a broken-wind appears, for a horse to have a dry obstinate cough, without any visible sickness or loss of appetite; but, on the contrary, a disposition to foul feeding, eating the litter, and drinking much water.

In order then to prevent, as much as possible, this

disorder, bleed him, and give him the mercurial physic above prescribed, which should be repeated two or three times.

The following balls are then to be taken for some time, which have been found extremely efficacious in removing obstinate coughs.

TAKE aurum mosaicum, finely powdered, eight ounces; myrrh and elecampane, powdered, each four ounces; aniseeds and bay-berries, each an ounce; saffron, half an ounce; make into balls with oxymel squills.

The aurum mosaicum is made of equal parts of quicksilver, tin, sal ammoniac, and sulphur. We give this medicine as strongly recommended by Mr Gibson; but how far the aurum mosaicum may contribute to its efficacy, may perhaps justly be disputed: as a substitute in its room, therefore, for this purpose, we recommend the same quantity of powdered squills, or gum ammoniacum, or equal parts of each.

Broken-winded horses should eat sparingly of hay, which as well as their corn may be wetted with chamber-lye, or fair water; as this will make them less craving after water.

The volatile salts in the urine may make it preferable to water, and may be the reason why garlic is found so efficacious in these cases; two or three cloves given at a time in a feed, or three ounces of garlic bruised, and boiled in a quart of milk and water, and given every other morning for a fortnight, having been found very serviceable; for by warming and stimulating the solids, and dissolving the tenacious juices which choke up the vessels of the lungs, these complaints are greatly relieved.

Careful feeding and moderate exercise has greatly relieved broken-winded horses.

Horses sent to graze in order to be cured of an obstinate cough, have often returned completely broken-winded, where the pasture has been rich and succulent, so that they have had their bellies constantly full. As the ill consequences therefore are obvious, where you have not the conveniency of turning out your horse for a constancy, you may soil him for a month or two with young green barley, tares, or any other young herbage.

To pursue thick-winded horses, Barbadoes and common tar have often been given with success, to the quantity of two spoonfuls, mixed with the yolk of an egg, dissolved in warm ale, and given fasting two or three times a week, especially those days you hunt or travel.

But in order to make all these sorts of horses of any real service to you, the grand point is to have a particular regard to their diet, observing a just economy both in that and their exercise; giving but a moderate quantity of hay, corn or water, at a time, and moistening the former, to prevent their requiring too much of the latter, and never exercising them but with moderation, as has before been observed. The following alterative ball may be given once a fortnight or three weeks, and as it operates very gently, and requires no confinement but on those days it is given when warm meat and water are necessary, it may be continued for two or three months.

TAKE socotorine aloes six drams; myrrh, galbanum, and ammoniacum, of each two drams; bay-berries

Broken
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ries half an ounce : make into a ball with a spoonful of oil of amber, and a sufficient quantity of syrup of buckthorn.

Mr Taplin ridicules the idea of overgrown lungs, and suggests the following as grounds of a more rational opinion concerning the source of this disease.

"Whether horses who have been in the habit of full or foul feeding, with a very trifling portion of exercise, and without any internal cleansing from evacuations, compulsively obtained by purgatives or diuretics, may not constantly engender a quantity of viscid, tough, phlegmatic matter; which accumulating by slow degrees, may so clog and fill up some of that infinity of minute passages with which the lungs are known to abound, as probably to obstruct the air vessels in their necessary expansion for the office of respiration? And whether this very probable obstruction or partial suppression may not in sudden, hasty, and long continued exertions, rupture others, and by such local deficiency affect the elasticity of the whole? The probability, and indeed great appearance of this progress, has ever influenced me forcibly to believe, that such obstructions once formed, the evil accumulates, till a multiplicity of the vessels become impervious, and render the lungs, by their constant accumulation and distention, too rigid for the great and necessary purpose of respiration."

That such a defect may sometime, occur, as a chest too narrow for lungs of an uncommon extension, that constitute naturally what are called *thick-winded horses*, our author does not deny : in which cases it is agreed, there is no hope of a cure, nor scarcely of any alleviation. But he will by no means admit the above deformity to be a case of common occurrence, far less that it is the universal or even most ordinary cause of broken wind.

"It cannot but be observed (says he) what an anxious desire a broken-winded horse always displays to obtain water; a self-evident conviction he is rendered uneasy by some glutinous adhesive internal substance, that instinct alone prompts the animal to expect drinking may wash away : on the contrary, if, as Bartlet and Gibson suppose, 'the lungs are too large for the chest,' every thing that increases the bulk of the abdomen or viscera (and consequently the pressure upon the diaphragm) must increase the disquietude, which is natural to believe from the sagacity of animals in other instances, they would in this most carefully avoid."

Mr Taplin therefore concludes, that if his hypothesis is founded in fact (which circumstances will not allow him the least reason to doubt), a cure may certainly be expected, provided the attempt is made upon the first appearance of the disease; though he does not hold out the probability where the original cause has been of long standing, and no attempts made to relieve.

In attempting the cure, the natural and obvious indications are, To promote the necessary evacuations in the first instance, to attenuate the viscidness of the glutinous obstructed matter, and to deterge the passages by a stimulation of the solids. Bleeding is therefore the first measure; and it ought to be repeated at proper intervals in moderate quantities, till divested of the coat of size and livid appearance that are certain signs of the lungs being obstructed either by viscidness or in-

flammation. After bleeding, the horse must go thro' a regular course of the mild purging balls prescribed after recovery from pleurisy. They are slightly impregnated with mercurial particles, and blended with the gums form a most excellent medicine for the purpose. In three days after the operation of the third dose, Mr Taplin directs to begin upon the following detergent balsamics, and continue to give one ball every morning, so long as may be thought necessary to form a fair opinion whether the advantage is gained or relief likely to be obtained.

TAKE of the best white soap eight ounces; gum guaiacum and ammoniacum, each three ounces; myrrh and Benjamin, aniseed and liquorice, each two ounces; balsam of Peru, Tolu, and oil of aniseed, each half an ounce; Barbadoes tar sufficient to make a mass, which divide into twenty balls.

It is necessary to be strictly observed, that during this course, hay and water are to be dispensed with a very sparing hand, so as to prevent too great an accumulation in the stomach or intestines, that an observation may be made with the greatest certainty, whether any hopes of success from medicine may be justly entertained; if not, farther expence will be unadvisable, as it will appear after such trial, an incurable malady at all events, and only susceptible of palliation.

SECT. XII. Of a Consumption.

WHEN a consumption proceeds from a defect in a horse's lungs or any principal bowel, the eyes look dull; the ears and feet are mostly hot; he coughs sharply by fits; sneezes much, and frequently groans with it; his flanks have a quick motion: he gleans often at the nose, and sometimes throws out a yellowish curdled matter; and he has little appetite to hay, but will eat corn, after which he generally grows hot.

As to the cure, one of the principal things is bleeding in small quantities (a pint, or pint and half, from some horses is sufficient), which should be repeated as often as the breath is more than ordinarily oppressed. Pectorals may be given to palliate present symptoms; but as dissections have discovered both the glands of the lungs and mesentery to be swelled, and often indurated, the whole stress lies on mercurial purges, and the following ponderous alteratives, given immediately.

TAKE native cinnabar, or cinnabar of antimony, one pound, powdered very fine, and add the same quantity of gum guaiacum and nitre; give the horse an ounce of this powder twice a-day, wetting his feeds.

The spring grass is often extremely serviceable; but the salt marshes are to be preferred, and to be more depended on than medicines; for great alterations are thereby made in the blood and juices, and no small benefit arises from open air and proper exercise.

SECT. XIII. Of Apoplexy or Staggers, Lethargy, Epilepsy and Palsy.

FARRIERS generally include all distempers of the head under two denominations, viz. *staggers* and *convulsions*, wherein they always suppose the head primarily affected. But in treating these disorders, we will distinguish

Apoplexy, Lethargy, &c. distinguish between those that are peculiar to the head, as having their source originally thence; and those that are only concomitants of some other disease.

In an apoplexy a horse drops down suddenly, without other sense or motion than a working at his flanks.

The previous symptoms are, drowsiness; watery eyes, somewhat full and inflamed; a disposition to reel; feebleness; a bad appetite; the head almost constantly hanging, or resting on the manger; sometimes with little or no fever, and scarce any alteration in the dung or urine; the horse is sometimes disposed to rear up, and apt to fall back when handled about the head; which is often the case with young horses, to which it does not suddenly prove mortal, but with proper help they may sometimes recover. If the apoplexy proceeds from wounds or blows on the head, or matter on the brain; besides the above symptoms, the horse will be frantic by fits, especially after his feeds, so as to start and fly at every thing. These cases seldom admit of a perfect recovery; and when horses fall down suddenly, and work violently at the flanks, without any ability to rise after a plentiful bleeding, they seldom recover.

All that can be done is to empty the vessels as speedily as possible, by striking the veins in several parts at once, bleeding to four or five quarts; and to raise up the horse's head and shoulders, supporting them with plenty of straw. If he survives the fit, cut several rowels: give him night and morning glysters prepared with a strong decoction of fenna and salt, or the purging glyster mentioned in the directions; blow once a day up his nostrils a dram of powder of asarabacca, which will promote a great discharge; afterwards two or three aloetic purges should be given; and to secure him from a relapse, by attenuating and thinning his blood, give him an ounce of equal parts of antimony and crocus metallorum for a month; or, which is preferable, the same quantity of cinnabar of antimony and gum guaiacum.

If the fit proceeds only from fulness of blood, high feeding, and want of sufficient exercise, or a sily blood (which is often the case with young horses, who though they reel, stagger, and sometimes suddenly fall down, yet are easily cured by the above method), an opening diet with scalded bran and barley will be necessary for some time; and the bleeding may be repeated in small quantities.

As to the other disorders of the head, such as lethargy or sleeping evil, epilepsy or falling-sickness, vertigo, frenzy, and madness, convulsions, and paralytical disorders, as they are most of them to be treated as the apoplexy and epilepsy, by bleeding and evacuations, with the alteratives there directed, we shall wave treating of them separately; but mention some particular rules to distinguish them, according to the plan we laid down; and then offer some general remedies for the several purposes.

In an epilepsy, or falling-sickness, the horse reels and staggers, his eyes are fixed in his head, he has no sense of what he is doing, he stales and dungs insensibly, he runs round and falls suddenly; sometimes he is immoveable, with his legs stretched out as if he was dead, except only a quick motion of his heart and lungs, which causes a violent working of his flanks; sometimes he has involuntary motions, and shaking of his limbs,

so strong, that he has not only beat and spurned his litter, but the pavement with it; and with these alternate symptoms a horse has continued more than three hours, and then has as surprisingly recovered: at the going off of the fit, he generally foams at the mouth, the foam being white and dry, like what comes from a healthful horse when he champs on the bit.

But in all kinds of gripes, whether they proceed from disorders in the guts, or retention of urine, a horse is often up and down, rolls and tumbles about; and when he goes to lie down, generally makes several motions with great seeming carefulness, which shows he has a sense of his pain; and if he lies stretched out for any time, it is generally but for a short space.

Epilepsies and convulsions may arise from blows on the head, too violent exercise, and hard straining; and from a fulness of blood, or impoverished blood; and surfeits; which are some of the causes that denote the original disorder.

In lethargic disorders, the horse generally rests his head with his mouth in the manger, and his pole often reclined to one side; he will show an inclination to eat, but generally falls asleep with his food in his mouth, and he frequently swallows it whole without chewing: emollient glysters are extremely necessary in this case, with the nervous balls recommended for the staggers and convulsions; strong purges are not requisite, nor must you bleed in too large quantities, unless the horse be young and lusty. In old horses, rowels and large evacuations are improper; but volatiles of all kinds are of use when they can be afforded; the alterative purge mentioned at the end of this section may be given and repeated on amendment.

This distemper is to be cured by these means, if the horse is not old and past his vigour. It is a good sign if he has a tolerable appetite, and drinks freely without flabbering, and if he lies down and rises up carefully, though it be but seldom.

But if a lethargic horse does not lie down; if he is altogether stupid and careless, and takes no notice of any thing that comes near him; if he dungs and stales seldom, and even while he sleeps and dozes, it is a bad sign: if he runs at the nose thick white matter, it may relieve him; but if a viscid gleet, that sticks to his nostrils like glue, turn to a profuse running of ropy, reddish, and greenish matter, it is an infallible sign of a great decay of nature, and that it will prove deadly.

Young horses from four to six years, are very subject to convulsions, from bots in the spring; and the large coach breed more than the saddle. They are seized without any previous notice; and if bots and worms are discovered in their dung, the cause seems to be out of doubt, more especially if they have lately come out of a dealer's hands.

When this convulsion proceeds from a distemperature of the midriff, or any of the principal bowels, it is to be distinguished from bots and vermin by previous symptoms; the horse falls off his stomach, and grows gradually weak, feeble, and dispirited, in his work, and turns short-breathed with the least exercise.

The lively description of that universal cramp or convulsion, called by some the *stag-evil*, which seizes all the muscles of the body at once, and locks up the jaws, so that it is impossible almost to force them open, we shall give in Mr Gibson's own words, who says: As soon as

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Apoplexy, the horse is seized, his head is raised with his nose towards the rack, his ears pricked up, and his tail cocked, looking with eagerness as an hungry horse when hay is put down to him, or like a high-spirited horse when he is put upon his mettle; inasmuch, that those who are strangers to such things, when they see a horse stand in this manner, will scarce believe any thing of consequence ails him; but they are soon convinced, when they see other symptoms come on apace, and that his neck grows stiff, cramped, and almost immovable: and if a horse in this condition lives a few days, several knots will arise on the tendinous parts thereof, and all the muscles, both before and behind, will be so much pulled and cramped, and so stretched, that he looks as if he was nailed to the pavement, with his legs stiff, wide, and straddling; his skin is drawn so tight on all parts of the body, that it is almost impossible to move it; and if trial be made to make him walk, he is ready to fall at every step, unless he be carefully supported; his eyes are so fixed with the inaction of the muscles, as give him a deadness in his looks; he snorts and sneezes often, pants continually with shortness of breath; and this symptom increases continually till he drops down dead; which generally happens in a few days, unless some sudden and very effectual turn can be given to the disorder.

In all these cases the horse should first be bled plentifully, unless he is low in flesh, old, or lately come off any hard continued duty; then you must be more sparing of his blood; afterwards give the following ball:

TAKE asafetida half an ounce, Russia castor powdered two drams, valerian root powdered one ounce; make into a ball with honey and oil of amber.

This ball may be given twice a-day at first; and then once, washed down with a decoction of mistletoe or valerian sweetened with liquorice or honey: an ounce of asafetida may be tied up in a piece of strong coarse linen rag, and put behind his grinders to champ on.

The laxative purges and emollient glysters should be given intermediately to keep the body open; but when the former balls have been taken a week or ten days, the following may be given once a-day with the valerian decoction.

TAKE cinnabar of antimony six drams; asafetida half an ounce; aristolochia, myrrh, and bay-berries, of each two drams; make into a ball with treacle and oil of amber.

This is the most effectual method of treating these disorders; but when they are suspected to arise from botts and worms, which is generally the case, mercurial medicines may lead the way, thus:

TAKE mercurius dulcis and philonium, of each half an ounce; make into a ball with conserves of roses, and give the horse immediately: half the quantity may be repeated in four or five days.

The following infusion should then be given, to the quantity of three or four horns, three or four times a-day, till the symptoms abate; when the above nervous balls may be continued till they are removed.

TAKE penny-royal and rue of each two large handfuls, camomile flowers one handful, asafetida and castor of each half an ounce, saffron and liquorice-root sliced of each two drams; infuse in two

quarts of boiling water; pour off from the ingredients as wanted.

If the castor is omitted, add an ounce of asafetida.

The following ointment may be rubbed into the cheeks, temples, neck, shoulders, spine of the back, and loins, and wherever there is the greatest contractions and stiffness.

TAKE nerve and marshmallow ointment of each four ounces, oil of amber two ounces, with a sufficient quantity of camphorate spirit of wine; make a liniment.

When the jaws are so locked up that medicines cannot be given by the mouth, it is more eligible to give them by way of glyster: for forcing open the jaws by violence often puts a horse into such agonies, that the symptoms are thereby increased.

In this case also he must be supported by nourishing glysters, made of milk-pottage, broths, &c. which must be given to the quantity of three or four quarts a-day: glysters of this kind will be retained, and absorbed into the blood; and there have been instances of horses thus supported for three weeks together, who must otherwise have perished.

Mr Gibbon mentions some extraordinary instances of success in cases of this sort by these methods, and repeated frictions, which are extremely serviceable in all convulsive disorders, and often prevent their being jaw-set; they should be applied with unwearied diligence every two or three hours, wherever any stiffness or contractions in the muscles appear; for a horse in this condition never lies down till they are in some measure removed.

The use of rowels in these cases is generally unsuccessful, the skin being so tense and tight, that they seldom digest kindly, and sometimes mortify: so that if they are applied, they should be put under the jaws, and in the breast.

The red-hot iron so frequently run through the fore-top and mane, near the occipital bone, for this purpose, has often been found to have destroyed the cervical ligament.

In paralytic disorders, where the use of a limb or limbs is taken away, the internals above recommended should be given, in order to warm, invigorate, and attenuate the blood; and the following stimulating embrocation should be rubbed into the parts affected.

TAKE oil of turpentine four ounces, nerve ointment and oil of bays of each two ounces, camphor rubbed fine one ounce, rectified oil of amber three ounces, tincture of cantharides one ounce.

With this liniment the parts affected should be well bathed for a considerable time, to make it penetrate: and when the hind parts chiefly are lame, the back and loins would be well rubbed with the same. To the nervous medicines above recommended may be added snake-root, contrayerva, mustard-seed, horse-radish root, steeped in strong beer, or wine where it can be afforded. Take the following for an example, which may be given to the quantity of three pints a-day alone, or two horns full may be taken after the nervous balls.

TAKE snake-root, contrayerva, and valerian, of each half an ounce; mustard-seed and horse-radish root scraped, of each two ounces; long pepper two drams: infuse in three pints of strong wine.

When

Apoplexy,
Lethargy,
&c.

Strangles
and Vives.

When the horse is recovering from any of the above disorders, the following alterative purge may be repeated two or three times, as it operates very gently.

TAKE socotorine aloes one ounce, myrrh half an ounce, asafetida and gum ammoniacum of each two drams, saffron one dram; make into a ball with any syrup.

Where a retention of dung is the cause of this disorder, the great gut should first be raked thoroughly with a small hand, after which plenty of emollient oily glysters should be thrown up, and the opening drink given, till the bowels are thoroughly emptied of their imprisoned dung. Their diet should for some days be opening, and consist chiefly of scalded bran, with flour of brimstone, scalded barley, &c.

SECT. XIV. *Of the Strangles, and Vives.*

1. THE Strangles is a distemper to which colts and young horses are very subject. The symptoms and progress of this disease are as follows: A dull heaviness and inactivity, loss of appetite, and a hollow husky cough, occasioned by the irritability of the inflamed glandular parts in the throat and about the root of the tongue. To excite a degree of moisture in the mouth that may allay this disagreeable sensation, the horse is often picking his hay, but eats little or none; a degree of symptomatic heat comes on, and a consequent clamminess and thirst is perceptible. As the distemper advances, he becomes proportionally languid and inattentive; a swelling (with sometimes two or three smaller surrounding it) is now discovered to have formed itself between the jaw-bones, which is at first very hard, exceeding painful, and visibly increasing; he now swallows with difficulty, heaves in the flanks, and his whole appearance gives signs of the greatest distress.

The first object for consideration is the state of the subject: if the evacuations are regular (as they generally are), and the feverish symptoms moderate, let the swelling be examined, and its suppuration promoted. For this purpose (first clipping away all the long or superfluous hairs that cover or surround the part, foment with small double flannels, dip in a strong decoction of camomile, marsh-mallows, or rosemary, for ten minutes, as hot as can be conveniently submitted to; and then apply a poultice prepared as follows.

TAKE of coarse bread, barley meal, and camomile or elder flowers, each a handful; boil over the fire in a sufficient quantity of milk, or in the decoction for the fomentation; into which stir about a third (of the whole quantity) of white-lily root, washed clean and pounded to a paste; adding linseed and fenugreek (in powder) of each an ounce; stirring in, while hot, of turpentine two ounces, and of lard four, laying it on moderately warm, and bandaging firm. To serve for two poultices.

Both the fomentation and poultice must be repeated every night and morning till an opening in the swelling is effected, which generally happens in the course of five or six days. Upon the appearance of discharge, the aperture may be a little enlarged with a bistory or the point of any sharp instrument adequate to the purpose, though this will be unnecessary if the discharge is made freely and easily of itself. The

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part should then be dressed with the following ointment spread on tow, still continuing the poultice over it to promote the digestion, and prevent any remaining hardness.

TAKE rosin and Burgundy pitch of each a pound, and a half, honey and common turpentine each eight ounces, yellow wax four ounces, hog's-lard one pound, verdigris finely powdered one ounce; melt the ingredients together, but do not put in the verdigris till removed from the fire; and it should be stirred in by degrees till the whole is grown stiff and cool.

If the fever and inflammation run high, and the swelling be so situated as to endanger suffocation, a moderate quantity of blood must be taken away.

In this disorder, mashes must be the constant food, in small proportions, to prevent waste: in each of which Mr Taplin directs to put of liquorice and aniseed powders half an ounce, and about two ounces of honey, or in lieu of this last a quart of malt: The drink, consisting of warm water impregnated with a portion of scalded bran or water-gruel, should be given in small quantities and often. The head must be kept well covered with flannel, as the warmth will greatly tend to assist in promoting the necessary discharge: tho', unless circumstances and weather forbid, the horse need not be confined, but should have the advantage of air and short gentle exercise. Nor should regular dressing, and the accustomed course of stable discipline, be omitted, but only used in a less degree than formerly when in health.

This distemper is seldom dangerous, unless from neglect, ignorant treatment, or cruel usage. It generally terminates with a running at the nose, in a greater or less degree; which should be frequently cleansed from the inside of the nostrils, by means of a sponge sufficiently moistened in warm water, to prevent its acquiring an adhesion to those parts, or a foulness and fetor that would shortly become acrimonious.

If a hardness remains after the sores are healed up, they may be anointed with the following mercurial ointment.

TAKE of crude mercury or quicksilver one ounce, Venice turpentine half an ounce; rub together in a mortar till the globules of the quicksilver are no longer visible; then add, by little and little, two ounces of hog's-lard, just warm and liquefied; and let the whole be kept close covered for use. When the horse has recovered his strength, purging will be necessary.

If a copious and offensive discharge from the nostrils should continue after the abscess is healed up, there will be reason to suspect the disease called *glanders*, treated of in a subsequent section.

2. The Vives or Ives differ from the strangles only in this; that the swellings of the kernels seldom gather or come to matter, but by degrees perspire off and disperse by means of warm cloathing, anointing with the marshmallow ointment, a moderate bleeding, and a dose or two of physic. But should the inflammation continue notwithstanding those means, a suppuration must be promoted by the methods recommended in the strangles.

When these swellings appear in an old or full-aged horse, they are signs of great malignity, and often of

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Diseases of an inward decay, as well as forerunners of the glanders. the Eyes.

trafled. The appearances of this blemish are various, as well as the causes and effects, some of its subjects being totally blind, and others barely enabled to distinguish between light and darkness. The signs are a blackness of the pupil, an alteration of the size of the eye, and its not contracting or dilating upon a sudden exposure to any degree of light. In order to the cure, it is necessary to attend to the cause, and to apply such remedies as that may indicate: though in truth it is a disorder in which, from whatever cause originating, no great expectation can be formed from medicine either internally or externally: more particularly from the former, the seat of disease being so far out of the reach of medicinal action. If the defect should be owing to a contraction of or compression upon the optic nerve, very little can be done with any expectation of success: and much less if it arises from a palsy of that or any neighbouring part.

SECT. XV. Of the Diseases of the Eyes.

1. THE cases that most frequently occur, requiring medical aid, or admitting of cure, are generally the effects either of cold, or of blows, bites, or other external injuries. In those proceeding immediately from cold, there is perceived an inflammation upon the globe of the eye, and internal surrounding parts, as the edges of the eye-lids, &c. Instead of its former transparency, the eye has a thick cloudy appearance upon its outer covering, and is constantly discharging an acrid serum, which in a short time almost excoriates the parts in its passage. The horse drops his ears, becomes dull and sluggish, is frequently shaking his head as if to shake off the ears, and in every action discovers pain and disquietude. In this case, after bleeding, the treatment prescribed in the Section of *Colds* must be adopted and persevered in; and to cool the parts, and allay the irritation occasioned by the scalding serum, let the eyes and surrounding parts be gently washed twice or thrice every day with a sponge or tow impregnated with the following solution:

SUGAR of lead one dram, white vitriol two scruples, spring water half a pint, brandy or camphorated spirits one ounce or two table-spoonfuls.

If the inflammation should not seem likely to abate, but to wear a threatening appearance, the following diuretic medicine must be administered.

CASTILE SOAP twelve ounces, yellow rosin and nitre (in powder) each eight ounces, powdered camphire one ounce, and oil of juniper six drams; mixed with a sufficient quantity of syrup or honey. The mass is to be divided into 12 balls, rolled up in liquorice or aniseed powder; one of which is to be given every morning, using also gentle work or moderate exercise.

2. The effects arising from blows or bites form different appearances, according to the severity of the injury sustained. Should inflammation and swelling proceed from either cause, bleeding will be necessary without delay, and may be repeated at proper intervals till the symptoms appear to abate; and let the parts be plentifully embrocated four times a-day with the following preparation of Goulard's cerate.

EXTRACT of Saturn three drams: camphorated spirits one ounce; river or pond water one-pint. The extract to be first mixed with the spirits, and then the water to be added.

If a large swelling, laceration, or wound, attends; after washing with the above, apply a warm poultice of bread, milk, and a little of the lotion, softened with a small portion of hog's-lard or olive oil. In cases of less danger, or in remote situations where medicines are not easily procured, the following may be used as a substitute.

BEST white-wine vinegar half a pint, spring water a quarter of a pint, and best brandy a wine glass or half a gill.

3. As to the gutta serena, cataract, film, &c. these are cases in which relief is very seldom obtained.

The gutta serena is a partial or universal loss of sight, where no palpable defect or fault appears in the eye, except that the pupil is a little more enlarged or con-

A cataract is a defect in the crystalline humour of the eye, which, becoming opaque, prevents the admission of those rays upon the retina that constitute vision. The disorder called *moon-eyes*, are only cataracts forming. These generally make their appearance when a horse is turned five coming six; at which time one eye becomes clouded, the eye-lids being swelled, and very often shut up; and a thin water generally runs from the diseased eye down the cheek, so sharp as sometimes to excoriate the skin; the veins of the temple, under the eye, and along the nose, are turgid and full: though sometimes it happens that the eye runs but little. This disorder comes and goes till the cataract is ripe; then all pain and running disappears, and the horse becomes totally blind, which is generally in about two years. During this time some horses have more frequent returns than others; which continue in some a week or more, in others three or four; returning once in two or three months, and they are seldom so long as five without a relapse. There is another kind of *moon blindness* which is also the forerunner of cataracts, where no humour or weeping attends. The eye is never shut up or closed here, but will now and then look thick and troubled, at which time the horse sees nothing distinctly: when the eyes appear sunk and perishing, the cataracts are longer of coming to maturity; and it is not unusual in this case for one eye to escape. These cases generally end in blindness of one if not of both eyes. The most promising signs of recovery are when the attacks come more seldom, and their continuance grows shorter, and that they leave the cornea clear and transparent, and the globe plump and full.

In all blemishes or defects, where a thickening of some one of the coats, membranes, or humours of the eye, has formed an appearance of cataract or film, it has been an established custom among most farriers to bestow a plentiful application of corrosive powders, unguents, and solutions, for the purposes of obliteration; without reflecting (as Mr Taplin observes) upon the absurdity of endeavouring to destroy by corrosion, what is absolutely separated from the surface by a variety of membranous coverings, according to the distinct seat of disease; with which it is impossible to bring the intended remedy into contact, without first destroying the intervening or surrounding parts by which the inner delicate structure is so numerously guarded. But in all disorders of this sort, whether moon-eyes or confirmed

Glanders. firmed cataracts with a weeping, general evacuations with internal alteratives can only take place. Indeed the attempts to cure cataracts have hitherto generally produced only a palliation of the symptoms, and sometimes have proved entirely destructive. Yet early care, it is said, has in some instances proved successful. To this end rowelling is prescribed, with bleeding at proper intervals, except where the eyes appear sunk and perishing. It is also directed, during the violence of the symptoms, to observe a cooling treatment; giving the horse two ounces of nitre every day mixed into a ball with honey; and bathing the parts above the eye with verjuice or vinegar wherein rose-leaves are infused, to four ounces of which half a drachm of sugar of lead may be added. The swelling on the lid may afterwards be bathed with a sponge dipt in equal parts of lime and Hungary water mixed together; and the following cooling physic should be given every fourth day, till the eye becomes clear.

LENITIVE electuary and cream of tartar of each four ounces, Glauber's salts three ounces, syrup of buckthorn two ounces.

When the weeping is by these means removed, the alterative powders (see the Section Of *Alterative Medicines*) should be given every day, till two or three pounds are taken, and after an interval of three months the same course should be repeated. This method, it is affirmed, has often been attended with good success, where the eyes have been full and no way perished.

4. The haws is a swelling and sponginess that grows in the inner corner of the eye, so large sometimes as to cover a part of the eye. The operation here is easily performed by cutting part of it away; but the farriers are apt to cut away too much: the wound may be dressed with honey of roses; and if a fungus or spongy flesh arises, it should be sprinkled with burnt alum, or touched with blue vitriol.

SECT. XVI. Of the glanders.

M. DE LA FOSSE has distinguished seven different kinds of glanders, four of which are incurable.

The first proceeds from ulcerated lungs, the purulent matter of which comes up the trachea, and is discharged through the nostrils, like a whitish liquor, sometimes appearing in the lumps and grumes: in this disorder, though the matter is discharged from the nostrils, yet the malady is solely in the lungs.

The second is a wasting humour, which usually seizes horses at the decline of a disease, caused by too hard labour; this defluxion also proceeds from the lungs.

The third is a malignant discharge, which attends the strangles sometimes, and falls upon the lungs, which runs off by the nostrils.

The fourth is, when an acrimonious humour in the farcy seizes these parts, where it soon makes terrible havoc.

The fifth kind we shall describe by and by, as arising from taking cold.

The sixth kind is a discharge from the strangles, which sometimes vents itself at the nostrils.

In the seventh sort, which he calls the *real glanders*, the discharge is either white, yellow, or greenish, sometimes streaked or tinged with blood: when the disease is of long standing, and the bones are fouled, the matter turns blackish, and becomes very fetid; and is

always attended with a swelling of the kernels or glands under the jaws; in every other respect the horse is generally healthy and sound, till the distemper has been of some continuance.

It is always a bad sign when the matter sticks to the inside of the nostrils like glue or stiff paste; when the inside of the nose is raw, and looks of a livid or lead colour; when the matter becomes bloody, and stinks; and when it looks of an ash-colour. But when only a limpid fluid is first discharged, and afterwards a whitish matter, the gland under the jaw not increasing, and the disorder of no long continuance, we may expect a speedy cure; for in this case, which arises from taking cold after a horse has been overheated, the pituitary membrane is but slightly inflamed, the lymph in the small vessels condensed, and the glands overloaded, but not yet ulcerated.

Our author affirms this disease to be altogether local; and that the true seat of it is in the pituitary membrane which lines the partition along the inside of the nose, the maxillary sinuses or cavities of the cheek-bones on each side the nose, and the frontal sinuses or cavities above the orbits of the eyes: that the viscera, as liver, lungs, &c. of glandered horses, are in general exceeding sound; and consequently that the seat of this disorder is not in those parts, as has been asserted by most authors. But on nicely examining by dissection the heads of such horses, he found the cavities abovementioned more or less filled with a viscous slimy matter; and the membrane which lines both them and the nostrils inflamed, thickened, and corroded with sordid ulcers, which in some cases had eat into the bones.

It is a curious remark of our author, that the sublingual glands, or the kernels situated under the jaw-bone, which are always swelled in this distemper, do not discharge their lymph into the mouth, as in man, but into the nostrils; and that he constantly found their obstruction agreed with the discharge: if one gland only was affected, then the horse discharged from one nostril only; but if both were, then the discharge was from both.

The seat of this disorder thus discovered, the mode of cure he had recourse to was by trepanning these cavities, and taking out a piece of bone, by which means the parts affected may be washed with a proper injection, and in fine the ulcers deterged, healed, and dried up: and his success, by his own account, was very great.

But as, from the observations since made by this gentleman, there are different species of the glanders: so the cure of the milder kinds may first be attempted by injections and fumigations. "Thus, after taking cold should a horse for 15 or 20 days discharge a limpid fluid or whitish matter from one or both nostrils, the glands under the jaw rather growing harder than diminishing, we may expect it will degenerate into a true glanders. To prevent which, after first bleeding, and treating him as we have directed for a cold, let an emollient injection, prepared with a decoction of linseed, marshmallows, elder camomile flowers, and honey of roses, or such like, be thrown up as far as possible with a strong syringe, and repeated three times a-day: should the running not lessen or be removed in a fortnight by the use of this injection, a restraining one may now be

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Glanders. prepared with tincture of roses, lime-water, &c. and the nostrils fumigated with the powders of frankincense, mastich, amber, and cinnabar, burnt on an iron heated for that purpose; the fume of which may easily be conveyed through a tube into the nostrils." Such is the method recommended by Bartlet, which he says has been found successful when used in time. But a more particular course of procedure will be afterwards described, that the reader may have the fullest information concerning this most difficult disease.

When the disorder is inveterate, recourse must be had to the operation above described, according to the doctrine of M. la Fosse.

The pretensions of that gentleman, however, have been lately exposed with seeming justice by Mr Taplin: and the following circumstances quoted from the French farrier's work seem sufficient of themselves to throw suspicion upon the whole. We are told of three horses he trepanned, each in two places: the internal parts were constantly syringed, and they were perfectly recovered; "the wound and perforation filling up in 26 days, the horses suffering no inconvenience from the operation, though after this experiment they were PUT TO DEATH." We are at last confidently assured, that such operations being performed, "after opening the cavities, should it by probing be discovered that the bones are carious (or, in other words, rotten), the best way then will be to dispatch the horse, to save unnecessary trouble and expence. Which Mr Taplin interprets in plain English thus: "Deprive the horse of half his head, in compliment to the pecuniary feelings of the farrier; and if you find the remaining half will not answer the purpose of the whole, cut his throat, or shoot him through the head, to save the operator's credit."

Mr Taplin also condemns the distinction of the disorder into different species; and the various symptoms that appear, he considers as only marking different stages of the same disease. The fact according to him appears to be, "that any corrosive matter discharged from the nostrils, and suffered to continue for a length of time, so as to constitute ulcerations and corrode the bones, will inevitably degenerate into and constitute the disease generally understood by the appellation of glanders; every stagnant, acrimonious, or putrid matter, is possessed of this property, and more particularly when lodged (or by sinuses confined) upon any particular part. Divested of professional trick, chicanery, and deception, this is the incontrovertible explanation, whether proceeding from an ulceration of the lungs, or the inveterate glandular discharges from the head (where the case is of long standing, and the bone carious) they are equally incurable." In this view, therefore, prevention, rather than cure, being the rational object of attention, it remains only to point out such methods as seem likely to obviate the disorder upon the slightest appearance of its approach, or upon the attack of any other disease that may be likely to terminate in it.

Where the lungs, then, are the seat of disease, as in the first attack of coughs, &c. no better treatment can be pursued than that laid down under the Sections of *Colds* and *Coughs*. But where a swelling shows that matter is forming under the ears, jaws, or about the

root of the tongue, let every possible method be taken to produce a suppuration and discharge of matter; for, in most cases, an external evacuation becomes the crisis, and is greatly preferable to the chance of mischief that may be produced by the morbid matter being absorbed into the system.

Should cough, difficulty of breathing, or a greater degree of inflammatory heat, attend, draw blood from a remote vein in moderate quantity, to mitigate either of those symptoms; and when the swellings about the parts have acquired an evident prominence, foment them twice a-day, for two or three days, with flannels dipped in the following decoction:

CAMOMILE, wormwood, marshmallows, and elder flowers, of each a large handful, boiled in three quarts of water for a quarter of an hour, and then strained off. Let the liquor be used hot, and apply the herbs warm by way of poultice to the parts.

In two or three days a judgment may be formed whether a suppuration is likely to take place. If so the tumors will increase in size, and feel soft and yielding in the middle when pressed; in which case apply the poultice, and proceed as directed above for the Strangles. If, on the contrary, the swellings continue hard and immovable, a running coming on at the nose; observe whether the matter is of a white colour and without smell; or is of different tinges, and streaked with blood. The former is a favourable sign; and in that case the treatment may be as directed under the Sections of *Cold* and *Cough*. But if the matter should prove of the latter description, every precaution ought to be instantly used, to prevent in its infancy what would soon become a case of much trouble. In the first place, therefore, in order to soften the viscid matter in the passages, and relax the inflammatory stricture of the glands, prepare a vapour bath of rosemary, lavender flowers, southernwood and marjoram (each a handful), boiled in two or three quarts of water. Put this into a pail, and let the horse's head be fixed over it as near as can be borne, and so long as the fumes passing up the nostrils can be supposed to take effect as an internal fomentation. This operation should be repeated twice every day: and much of the treatment recommended under coughs and strangles with glandular discharges from the nostrils, will at the same time appear proper to be observed, as being applicable to many of the present symptoms. Let it be particularly remembered, that during the whole course of management, the head of the horse is to be kept as warm as possible, and in proportion much more so than the body, either in a double kersey hood, or a single external, and a flannel one underneath; as nothing can contribute more to a solution of the humours and promotion of their discharge, than a critical relaxation of the pores, particularly upon the very seat of disease.

In case the discharge should continue to increase in quantity and virulence, become still more discoloured, and its smell very offensive; besides continuing the fumigation, let half a gill of the following injection (milk warm) be thrown up either nostril (or both if the matter should be so discharged) with a strong forcible syringe, three or four times a-day.

LINSEED,

Glanders.

LINSEED, an ounce; camomile and elder flowers, each half an ounce; water, three pints. Boil for a few minutes; then strain off, and add to the liquor four ounces of *mel Egyptiacum*, mixing well together at each time of using.

If the matter should notwithstanding grow so malignant as to threaten a corrosion and rottenness of the bones; besides a diligent use of both fumigation and injection, a course of mercurial unction must be immediately entered upon. Mr Taplin directs to "Let two, or at most three drams of the strong mercurial ointment (prepared as directed under *Strangler*) be very well rubbed into the glandular tumors, under the throat or ears, every night for a fortnight; first taking away with the scissars all superfluous or long hairs, that the mercurial particles may be with more certainty absorbed by the vessels, and taken into the circulation. If the owner of a horse labouring under this difficulty wishes, like a drowning man, to avail himself of another twig, he may call in the aid of mercurial physic, or alterative medicines."

Taplin's
Stable Di-
rectory, p.
306.

Ibid, p. 305.

Upon the whole of this subject: As long as the attack continues in its early and simple state, let unremitting attention be paid to the treatment recommended under the different heads of those symptoms that are then most predominant: but should that treatment, after a fair trial, prove insufficient to resist the progress of the disease, the glands under the jaw-bone "continuing during the whole course inflexible, the matter first tinged with blood, then becoming deep in colour and most offensive in smell, the carcase emaciated, and the whole frame sinking under universal depression, the first loss (says Mr Taplin) will be ultimately best, in a resignation of his hide to the collar-maker, and his remains to the hounds. As to the operation of trepanning, so plausibly held forth with all its specious advantages, I shall openly and fairly enter my protest against it. For what does the whole amount to more than this?—If the horse should absolutely recover, and (what is still more unlikely) become adequate to the very purposes he was destined to before the attack; when the long illness, support, attendance, and farrier's bill, are balanced against his value, he must be a most excellent horse, and very much above the line of mediocrity, to have the credit-account in his favour. In fact, the most probable conjecture is, his inevitable dissolution: but should he miraculously escape from both the distemper and operator, ranking under the denomination of a *cured horse*, he may, perhaps, be then qualified to linger out a wretched existence in some park or pasture, but never enabled to encounter labour or fatigue."

SECT. XVII. *Of the Colic or Gripes, and Pain in the Bowels, from sudden Accidents.*

THERE seems to be no distemper so little understood by the common farrier as the colic or gripes in horses, one general remedy or method serving them in all cases: but as this disorder may be produced by very different causes, the method of cure must also vary; otherwise the intended remedy, injudiciously applied, will not only aggravate the complaint, but make it fatal. We shall divide this disorder into three different species: the flatulent or windy, the bilious or inflam-

matory, and the dry gripes; each of which we shall distinguish by their different symptoms, and then point out the proper remedies.

1. The flatulent or windy colic may in general be readily distinguished by the rumbling of the confined air through the intestines: The horse is often lying down, and as suddenly rising again with a spring; he strikes his belly with his hinder feet, stamps with his fore-feet, and refuses his meat; when the gripes are violent, he will have convulsive twitches, his eyes be turned up and his limbs stretched out as if dying, his ears and feet being alternately very hot and cold; he falls into profuse sweats, and then into cold damps; strives often to stale, and turns his head frequently to his flanks; he then falls down, rolls about, and often turns on his back; this last symptom proceeds from a stoppage of urine, that almost always attends this sort of colic, which may be increased by a load of dung pressing on the neck of the bladder.

These are the general symptoms of colic and gripes from wind, drinking cold water when hot, and when the perspirable matter is retained, or thrown on the bowels by catching cold; in all which cases they are violently distended. Cribbing horses are more particularly subject to this complaint, by reason they are constantly sucking in great quantities of air.

The first intention is to empty the strait gut with a small hand dipped in oil, which frequently makes way for the confined wind to discharge itself, and by easing the neck of the bladder, the suppression of urine is taken off, and the horse stales and gets ease.

The following ball and glyster seldom fail of giving relief in these cases.

TAKE Strasburgh or Venice turpentine, and juniper-berries pounded, of each half an ounce; salt-prunella or saltpetre, an ounce; oil of juniper, one dram; salt of tartar, two drams: Make into a ball with any syrup; it may be given whole, and washed down with a decoction of juniper-berries, or a horn or two of ale.

If the horse does not break wind, or stale plentifully, he will find no relief: therefore in an hour or two give him another ball, and add to it a dram of salt of amber; which may be repeated a third time, if found necessary. During the fit the horse may be walked and trotted gently; but should by no means be harassed beyond his ability, or dragged about till he is jaded.

The following glyster may be given between the balls, or alone, and repeated occasionally.

TAKE camomile flowers two handfuls; anise, coriander, and fennel seeds, of each an ounce; long pepper half an ounce; boil in three quarts of water to two; and add Daffy's elixir, or gin, half a pint; oil of amber half an ounce, and oil of camomile eight ounces.

The signs of a horse's recovery, are his lying quiet, without starting or tumbling, and his gathering up his legs, and ceasing to lash out; and if he continues an hour in this quiet posture, you may conclude all danger over.

2. The next species of colic is the bilious or inflammatory. This, besides most of the preceding symptoms, is attended with a fever, great heat, panting, and dryness of the mouth: the horse also generally

Colic or
Gripes, &c.

Colic or Gripes, &c. rally throws out a little loose dung, with a hot scalding water: which, when it appears blackish, or of a reddish colour, and tend smell, denotes an approaching mortification.

In this case the horse should immediately be bled to the quantity of three quarts; and it should be repeated, if the symptoms do not abate in a few hours. The emollient glyster, with two ounces of nitre dissolved in it, should be thrown up twice a-day, to cool the inflamed bowels; plenty of gum arabic water should be taken; and a pint of the following drink given every two or three hours till several loose stools are procured, and then it should be given only night and morning till the disorder is removed.

TAKE senna three ounces, salt of tartar half an ounce; infuse in a quart of boiling water an hour or two; then strain off, and add two ounces of lenitive electuary, and four of Glauber's salts.

If this disorder is not removed by these means, but the inflammation and fever increase, attended with a discharge of the flesh-coloured water above described, the event will most probably be fatal; and the chief thing to be depended on now, must be a strong decoction of Jussit's bark, given to the quantity of a pint every three hours, with a gill of red port-wine.

A quart of the same may be used for a glyster, with two ounces of Venice turpentine, dissolved with the yolks of two eggs, an ounce of diascordium, and a pint of red wine, and given twice a-day: if the horse recovers, give two or three mild rhubarb purges.

3. The dry gripes, or colic which arises often from costiveness, is discovered by the horse's frequent and fruitless motion to dung, the blackness and hardness of the dung, the frequent and quick motion of his tail, the high colour of his urine, and his great restlessness and uneasiness.

In this case the strait gut should be examined and emptied with a small hand oiled properly for that purpose; the emollient oily glyster (p. 116. col. 2. par. 3.) should be thrown up twice a-day; and the above purging drink given, till the bowels are unloaded, and the symptoms removed.

The diet for a horse in the gripes should be scalded bran, warm water-gruel, or white water, made by dissolving four ounces of gum-arabic in a quart of water, and mixing it with his other water.

4. From this history and division of gripes and colics, with their different treatment, it appears how absolutely necessary it is they should be well understood, in order to be managed skilfully: it is plain, too, that violent hot medicines should in every species of this disorder be guarded against, and given with great caution and discretion, even in the first kind of flatulent colic, where indeed they can only be wanted; yet too often, when prepared by the farriers with oil of turpentine, geneva, pepper, and brine, &c. they even increase that disorder, by stimulating the neck of the bladder, too forcibly heating the blood, and inflaming the bowels, till a mortification is brought on them. These are, in general, the constant appearances of horses that die of this disorder; whose bowels being examined for that purpose, have been found inflamed, full of red and livid spots, sometimes quite black, crisped with extreme heat, and rotten.

SECT. XVIII. *Of the Lax and Scouring, with other Disorders of the Stomach and Bowels.*

Lax and Scouring, &c.

It is sometimes a nice matter to form a proper judgment when to controul or encourage a looseness; but these general rules may be a direction: If a healthy full horse, on taking cold, or upon hard riding, overfeeding, eating unwholesome food, or with a slight fever, should have a moderate purging, by no means think of stopping it; but rather encourage it with an open diet, and plenty of warm gruel: but if it continues long, with gripings, the mucus of the bowels coming away, and the horse losing his appetite and flesh, recourse must be had to proper medicines. If he voids great quantities of slime and greasy matter, give him the following drench, and repeat it every other day for three times.

TAKE lenitive electuary and cream of tartar of each four ounces, yellow rosin finely powdered one ounce, and four ounces of sweet oil; mix with a pint of water-gruel.

The following alterative ball alone has been found successful for this purpose when given twice a-week, with scalded bran and warm gruel.

TAKE socotorine aloes half an ounce, diapente one ounce; make into a ball with the juice of Spanish liquorice dissolved in water, and a spoonful of oil of amber. To this may be added two drams of myrrh, and a dram of saffron, and (where it can be afforded) half an ounce of rhubarb.

When the purging is attended with a fever, rhubarb should first be given to the quantity of half an ounce, with an ounce and half of lenitive electuary; at night, after the working, give half an ounce or more of diascordium in a pint of red wine mulled with cinnamon; and repeat it every day, and the rhubarb-ball once in two or three.

But if the distemper increases, the horse's flanks and belly look full and distended, and he appears griped and in pain, let this glyster be given, and the quantity of diascordium increased an ounce in his night-drink.

TAKE camomile flowers one handful, red roses half a handful, pomegranate and balauftines of each an ounce; boil in two quarts of water to one; strain off, and dissolve it in two or three ounces of diascordium and one of mithridate; to which may be added a pint of port wine. Repeat it once a-day.

If the flux continues violent, give an ounce of rock-alum, with an ounce and a half of bole, twice a-day; or, dissolve double this quantity with two ounces of diascordium, and the cordial ball, in two quarts of hartshorn drink; to which may be added a pint of port; and give the horse, three or four times a-day, a pint of this drink. For this purpose also a strong decoction of oak-bark may be given, with either of the above remedies, and to the same quantity; even by itself, it will be found on trial no inconsiderable remedy.

When the discharge is attended with an acrid mucus or slime, the griping and pains are very severe, the common lining of the bowels being washed away; in this

Lax and Scouring, &c. this case the following glyster should frequently be injected warm.

TAKE of tripe-liquor or thin starch two quarts, oil of olives half a pint, the yolk of six eggs well broke, and two or three ounces of coarse sugar.

Some horses, having naturally weak stomachs and bowels, throw out their aliment undigested; their dung is habitually soft and of a pale colour; they feed poorly, and get no flesh: to remedy this complaint, give the following purge two or three times; and then the infusion to the quantity of a pint every morning.

TAKE socotorine aloes six drams, rhubarb powdered three drams, myrrh and saffron each a dram; make into a ball with syrup of ginger.

Infusion.—TAKE zedoary, gentian, winter's-bark, and orange-peel, of each two ounces; pomegranate-bark and balauftines of each an ounce; camomile-flowers and centaury, each a handful; cinnamon and cloves, each an ounce; infuse in a gallon of port or strong beer.

The bloody-flux is a distemper horses are not very subject to; however, as it sometimes does occur, whenever blood is discharged, attended with gripings and great pain in the bowels, if the flux is not speedily restrained the horse probably may be soon lost: we recommend therefore the following glyster and drink for that purpose.

TAKE oak-bark four ounces, tormentil-root two ounces, burnt hartshorn three ounces; boil in three quarts of forge-water to two; strain off, and add two ounces of diascordium, four ounces of starch, and half a dram of opium.

A glyster may also be prepared with the same quantity of fat broth, starch, and opium, in order to plaster over the coats of the bowels, and abate their violent irritations. Also,

TAKE soft chalk two ounces, mithridate or diascordium one ounce, powder of Indian-root half a dram, liquid laudinum 50 or 60 drops; dissolve in a pint of hartshorn drink, and add to it four ounces of cinnamon-water and red wine; give it twice a-day.

Gum-arabic dissolved in hartshorn drink, or in common water, should be the horse's usual drink.

When horses are apt to be costive, from whatever cause it arises, gentle openers should be given; such as cream of tartar, Glauber's salts, and lenitive electuary; four ounces of any two of these dissolved in warm ale, whey, or water, given every other morning for two or three times, will answer this purpose; especially if assisted by an oily emollient glyster, prepared with a handful of salt. Scalded bran or barley, with an ounce of fenugreek and linseed, occasionally given, will prevent this complaint: but where it is constitutional, and proceeds from the power and force of digestion in the stomach and guts, as sometimes happens, and the horse is in perfect health, no inconvenience will arise from it; and it is observed that such horses are able to indure great fatigue and labour.

SECT. XIX. Of Worms and Botts.

AUTHORS have described three different sorts of worms that affect horses, viz. *Botts*, which young horses are often troubled with in the spring; the *Rotundi*,

or those resembling earth-worms; and the *Ascarides*, or those about the size of the largest sewing needle, with flat heads.

The botts which breed in the stomachs of horses, and are sometimes the cause of convulsions, appear to be very large maggots, composed of circular rings, with little sharp prickly feet along the sides of their bellies (like the feet of hog-lice), which by their sharpness (like the points of the finest needles) seem to be of use to fasten them to the part where they breed and draw their nourishment, and to prevent their being loosened from such adhesion before they come to maturity. The eggs from whence those botts are produced, are dispersed into clusters all round the lower orifice of the stomach, and are laid under the inner coat or thin membrane of the stomach; so that when the animals come to form and life, they burst through this inner coat with their breech and tail straight outwards, and their trunks so fixed into the muscular or fleshy coat of the stomach, that it sometimes requires a good pull to disengage them: from the blood of this last coat they draw their nourishment, which they suck like so many leeches, every one ulcerating and pursuing up the part where it fixes like a honey-comb; and they often make such quick havock as to destroy the horse.

The symptoms of worms are various. The botts that many horses are troubled with in the beginning of summer, are always seen sticking on the strait gut, and are often thrust out with the dung, with a yellowish coloured matter like melted sulphur: they are no ways dangerous there; but are apt to make a horse restless and uneasy, and rub his breech against the posts. The season of their coming is usually in the months of May and June; after which they are seldom to be seen, and rarely continue in any one horse above a fortnight or three weeks. Those that take their lodgment in the stomach, are extremely dangerous by causing convulsions; and are seldom discovered by any previous signs before they come to life, when they throw a horse into violent agonies. The other kinds are more troublesome than dangerous; but are known by the following signs: the horse looks lean and jaded, his hair stares as if he was surfeited, and nothing he eats makes him thrive; he often strikes his hind-feet against his belly; is sometimes griped, but without the violent symptoms that attend a cholic and strangury; for he never rolls and tumbles, but only shows uneasiness, and generally lays himself down quietly on his belly for a little while, and then gets up and falls a feeding; but the surest sign is when he voids them with his dung.

For the cure of botts in the stomach, calomel should first be given in large quantities, and repeated at proper intervals; Æthiop's mineral, or some of the under-mentioned forms, may be given afterwards.

But botts in the strait gut may be cured by giving the horse a spoonful of savin, cut very small, once or twice a-day in his oats or bran, moistened; and three or four cloves of garlic may be added to advantage. Give also an aloetic purge between whiles; the following stands recommended.

TAKE fine socotorine aloes, ten drams; fresh jalap, one dram; aristolochia, or birthwort, and myrrh powdered, of each two drams; oil of savin and amber,

Yellows, or
Jaundice.

amber, of each one dram; syrup of buckthorn enough to form into a ball.

But as the source of worms in general proceeds from a vitiated appetite and a weak digestion, recourse must first be had to mercurials, and afterwards to such things as are proper to strengthen the stomach, promote digestion, and by destroying the supposed ova, prevent the regeneration of these animals. Thus, two drams of calomel may be given with half an ounce of diapente, and mixed up with conserve of wormwood, overnight; and the next morning the above purge: these may be repeated six or eight days. Or the following mercurial purge may be given, which will be less troublesome, and no less efficacious.

TAKE crude quicksilver two drams, Venice turpentine half an ounce; rub the quicksilver till no glistening appears; then add an ounce of aloes, a dram of grated ginger, 30 drops of oil of savin, and a sufficient quantity of syrup of buckthorn to make a ball.

One of these balls may be given every six days, with the usual precautions in regard to mercurial physic; and the following powder intermediately.

TAKE powdered tin and Æthiop's mineral of each half an ounce: give every night in a mash, or among his corn.

The various preparations of antimony and mercury must be given several weeks together, in order to get entire riddance of these vermin. The Æthiop's mineral may be given to the quantity of half an ounce a-day; the mercurius alkalifatus to two drams a-day, incorporated with a bit of cordial ball. The cinnabar powders, as directed in the farcy, are no less effectual: and when worms are bred from high feeding, or unwholesome food; rue, garlic, tanfy, savin, box, and many other simples, may be given successfully; being for that purpose mixed with their food; as also cut tobacco, from half an ounce to an ounce a-day.

SECT. XX. *Of the Yellows, or Jaundice.*

HORSES are frequently subject to this distemper; which is known by a dusky yellowness of the eyes; the inside of the mouth and lips, the tongue, and bars of the roof of the mouth, looking also yellow. The horse is dull, and refuses all manner of food; the fever is slow, yet both that and the yellowness increase together. The dung is often hard and dry, of a pale yellow, or light pale green. His urine is commonly of a dark dirty brown colour; and when it has settled some time on the pavement, it looks red like blood. He stales with some pain and difficulty; and if the distemper is not checked soon, grows delirious and frantic. The off-side of the belly is sometimes hard and distended; and in old horses, when the liver has been long diseased, the cure is not practicable, and ends fatally with a wasting diarrhoea: but when the distemper is recent, and in young horses, there is no fear of a recovery, if the following directions are observed.

First of all bleed plentifully; and give the laxative glyster (p. 120. col. 2. last par.) as horses are apt to be very costive in this distemper; and the next day give him this purge:

TAKE of Indian rhubarb powdered one ounce and a half, saffron two drams, socotorine aloes six drams, syrup of buckthorn a sufficient quantity.

2

If the rhubarb should be found too expensive, omit it, and add the same quantity of cream of tartar, and half an ounce of castile soap, with four drams more of aloes. This may be repeated two or three times, giving intermediately the following balls and drink.

TAKE of Æthiop's mineral half an ounce, millepedes the same quantity, castile soap one ounce; make into a ball, and give one every day, and wash it down with a pint of the following decoction.

TAKE madder root and turmeric of each four ounces, burdock-root sliced half a pound, Monk's rhubarb four ounces, liquorice sliced two ounces; boil in a gallon of forge-water to three quarts; strain off, and sweeten with honey.

Balls of castile soap and turmeric may be given also for this purpose to the quantity of three or four ounces a-day, and will in most recent cases succeed.

By these means the distemper generally abates in a week, which may be discovered by an alteration in the horse's eyes and mouth; but the medicines must be continued till the yellowness is entirely removed.

Should the distemper prove obstinate, and not submit to this treatment, you must try more potent remedies, viz. mercurial physic, repeated two or three times at proper intervals; and then the following balls.

TAKE salt of tartar two ounces, cinnabar of antimony four ounces, live millepedes and filings of steel of each three ounces, saffron half an ounce, Castile or Venice soap half a pound; make into balls, the size of a pullet's egg, with honey; and give one night and morning, with a pint of the above drink.

It will be proper, on his recovery, to give two or three mild purges; and, if a fat full horse, to put in a rowel.

SECT. XXI. *Of the Disorders of the Kidneys and Bladder.*

THE signs of the kidneys being hurt or affected are, a weakness of the back and loins, difficulty of staling, faintness, loss of appetite, and deadness in the eyes; the urine is thick, foul, and sometimes bloody, especially after a violent strain. A horse diseased in his kidneys can seldom back, that is, move straight backwards, without pain, which is visible as often as he is put to the trial; the same thing is observable indeed in horses whose backs have been wrung and wrenched; but with this difference, that in the latter there is seldom any defect or alteration in the urine, except that it is higher coloured.

The consequences of a disordered state of the urinary organs are principally two; strangury and diabetes.

1. *Strangury*, or an obstruction of urine, may arise from different causes. When it is not owing to wind, or hardened dung pressing upon the neck of the bladder (as was observed in the section on Cholics), it may proceed from inflammation in the bladder or kidneys, ulcerations there, or spasms upon any particular part. When owing to inflammation or spasm, the general indications of cure are, to lessen the stricture upon the parts; to reduce the inflammation; and to promote the evacuation of urine: the first of which intentions may be answered by a moderate loss of blood; the second,

Disorders of the Kidneys, &c. cond, by the use of internal emollients; and the third, by gentle stimulants and mild diuretics.

In strangury from inflammation or spasm in the parts, the horse makes frequent motions to stale, stands wide and straddling, appears full in the flank, and somewhat dejected. The first measure, as already observed, is bleeding; and that more or less plentifully according to the urgency of the symptoms. In a convenient time after this operation, Mr Taplin recommends to throw up the following emollient glyster:

Stable Directory,
p. 363.

"TAKE of thin gruel three pints, nitre two ounces, gum arabic one ounce and an half, olive oil four ounces; let it be injected moderately warm, and retained in the body as long as possible.

"So soon after this glyster as the horse is inclined by appetite to receive it, give a mash of two parts malt and one bran, they having been scalded together and stirred till of a moderate warmth; after this, if the subject has not staled in consequence of bleeding, glyster, and mash, have the following balls expeditiously prepared to forward the evacuation:

"TAKE castile soap ten drams, sal prunella one ounce, camphire two drams, anniseed powder six drams, oil of juniper one dram and an half, syrup of marshmallows sufficient to make the mash; which divide into two equal parts, giving one in six hours after the other, if the former is not successful.

"These are very safe, mild, and efficacious, in general producing the desired effect without any uneasy sensations. Where a drink is preferred, as coming into a more applicable mode of administration, the following will prove equally serviceable:

"TAKE juniper berries (bruised) two ounces; boil in a pint and a half of water for some time, then strain (to produce by squeezing the berries three quarters of a pint); to this add nitre and gum Arabic (in powder) each an ounce.

"This drink, or the above ball, to be repeated at distinct periods of four hours each (if a repetition of the first at the end of six hours does not effect the desired purpose), till relief is obtained by plentiful evacuation."

As a suppression of urine arises sometimes from an inflammation of the parts; so at others from a paralytic affection, particularly of the kidneys, disabling them in their office of separating the urine from the blood: in this latter case, a general suppression taking place, the bladder is usually empty, so that a horse will make no motion to stale; and if he survives a few days in this condition, his body will swell to a great degree, break out in blotches all over, and death will soon close the scene.

Strangury sometimes also arises from an ulceration of the parts; which is a case almost as desperate as the preceding. The symptoms are: A visible disquietude; the evacuation not totally suppressed, being only at times obstructed; the urine frequently altering its appearance, being sometimes thick, depositing a turbid sediment as if impregnated with membranous matter; and at other times tinged with blood, the evident effect of a corroded solution of the diseased part. In this instance the following balls or drink

are recommended by Mr Taplin as the only probable means of relief.

"TAKE of myrrh one ounce, Castile soap and Locatelli's balsam each three ounces, nitre and anniseed (in powder) each two ounces, balsam of Peru six drams. Mix together with syrup of marshmallows, and divide into six balls, giving one every morning.

"In case spasm of the parts be also suspected, the following ball may be given, and repeated at such times as the circumstances of the case may render proper.

"TAKE of Castile soap half an ounce; nitre, rosin, and compound powder of gum tragacanth, each two drams; opium (in powder) ten grains; oil of juniper 30 drops.—Mix. *Ibid. p. 369.*

"The following drink may be substituted with equal effect if a liquid form is preferred:

"TAKE thin gruel three quarters of a pint, gum Arabic and nitre (in powder) each one ounce, liquid laudanum three drams.—Mix.

"This (as the ball above) may be occasionally repeated."

2. Horses subject to a *diabetes*, or profuse staling, if old, or of a weak constitution, are seldom cured; they soon lose their flesh and appetite, grow feeble, their coat staling, and they die rotten. Of a young horse there are more hopes: but he must not be indulged with too much water or moist food. Give him the following:

TAKE jesuits bark four ounces, bistort and tormentil-root of each two ounces; boil in two gallons of lime-water to the consumption of half, and give a pint three times a-day.

As this disorder generally proceeds from too violent exercise, over-straining, &c. repeated bleedings in small quantities are absolutely necessary, till the mouths of the vessels close up.

SECT. XXII. Of Molten-grease.

By molten-grease is meant a fat or oily discharge with the dung; and it arises from a colliquation or melting down of the fat of a horse's body by violent exercise in very hot weather. It is always attended with a fever, heat, restlessness starting and tremblings, great inward sickness, shortness of breath, and sometimes with the symptoms of a pleurisy. His dung will be extremely greasy, and he will fall into a scouring; his blood will have a thick skin or fat over it when cold, of a white or yellow hue, but chiefly the latter; the congealed part or sediment is commonly a mixture of size and grease, which makes it so extremely slippery, that it will not adhere to the fingers, and the small portion of serum feels also slippery and clammy. The horse soon loses his flesh and fat, which probably is dissolved and absorbed into the blood; and those that survive this shock commonly grow hide-bound for a time, their legs swelling both before and behind, and continue in this state till the blood and juices are rectified; and if this is not done effectually, the farcy or some obstinate surfeit generally follows, very difficult to remove.

In the first place bleed plentifully, and repeat it for
S two

Hide-
bound, Sur-
feits, &c.

two or three days successively in smaller quantities; two or three rowels should also be immediately put in, and the cooling emollient glysters (p. 121. col. 1. par. 1, 2.) daily thrown up to abate the fever, and drain off the greasy matter from the intestines. By the mouth give plenty of warm water or gruel, with cream of tartar, or nitre, to dilute and attenuate the blood, which in this case is greatly disposed to run into grumes, and in danger a total stagnation.

When the fever is quite gone off, and the horse has recovered his appetite, gentle aloetic purges should be given once a week, for a month or six weeks, in order to bring down the swelled legs. To this end give the following; which, repeated for some time, will entirely remove this disorder.

TAKE of socotorine aloes six drams, of gum guaiacum powdered half an ounce, of diaphoretic antimony and powder of myrrh each two drams; make into a ball with syrup of buckthorn.

These will seldom take a horse from his business above two or three days in a week; neither will he lose his flesh or appetite with them, but on the contrary mend in both; which cannot be obtained by any other method of purging, and gives this greatly the preference in many cases.

SECT. XXIII. Of Hide-bound, Surfeits, and Mange.

1. THE signs of *Hide-bound* are, "a want of flexibility in the skin, which is pervaded by a general stiffness that seems to form an entire adhesion to the flesh, without the least partial separation or distinction. There is a kind of dusky scurf, plainly perceived underneath the hair, that raises it up in different parts; and, giving it another hue, the coat in many places forms an appearance of two or three colours; conveying, even in this trifling circumstance, a very forcible idea of poverty in both food and raiment. The horse is generally languid, dull, heavy, and weak: his excrement is dark, foul, and offensive; he sweats much upon very moderate exertions; then his coat itares, the hair turns different ways (which in its effluvia is disagreeable), and affords evident proof of weakness and debilitation.

Bad food and want of stable care are, in general, the only probable reasons that can be assigned for this complaint. Long lank grass in low swampy land in autumn, and musty hay or bad oats at any season, may in some degree allay the hunger, but not gratify the appetite; for, being in itself destitute of the effect and quality of superior food, no nutritive contribution can be conveyed for the generating of blood or formation of flesh. The sources for the supply of chyle being thus obstructed, the lymphatics are deprived of their due proportion of nutritive fluid that should pass through these smaller vessels; and they become not only in some measure contracted, but in a great degree inactive, which, with the want of proper external care and dressing, contribute to an almost universal obstruction of the cutaneous pores. These, from the preternatural debilitation of the general system, are thrown open by the most moderate exercise.

In respect to its cure very few directions will be ne-

cessary, the case being no more than a temporary inconvenience, rather than a disease. Therefore, by way of affording some little change to the circulation, take away a small quantity of blood; and in three or four hours after, increase its *impetus* by a mash of malt, oats, and bran, equal parts. Continue this mash every night for a fortnight, stirring in two ounces of flower of brimstone every other night; and for his other feeds (morning and noon) give equal parts of oats and bran, with half a pint of old beans in each, to prevent relaxing the body too much by the mashes. At the same time, regular and substantial dressing, air, exercise, sound oats, sweet hay, and good soft water, will greatly contribute to promote the cure. And when by these means he has visibly improved in hide, coat, and condition, let him have twice in a week a brushing gallop, to produce a moderate sweat and promote the circulation; taking great care not to let him stand still till he is perfectly cool; when his dressings should be thoroughly gone through with attention, care, and perseverance, every night and morning. If this method should be unattended with success, there will be reason to suspect some unknown cause lurking behind; in which case go through a mild course of physic, feeding well between the doses.

2. Of *Surfeits*, according to Mr Taplin, there are two kinds, originating from different causes: One being no more than a very advanced stage of the case last described; which being long neglected, all its symptoms increase, till the entire mass of blood being at last affected, the virulence of the disorder displays itself upon the surface of the body.

The other kind of surfeit, differing from the former in cause, but very little in effect, is that where, from ignorance or inattention, a horse is suffered to drink immoderately of cold water, when in a violent perspiration, and the blood consequently in the highest degree of circulation.

The circulating fluid being so instantaneously checked by the influence of the frigid element and the sudden contraction of the solids, the crassamentum becomes immediately thickened and inflamed; while the serum or watery part, separating from the other, extravasates itself; and, by an effort of nature, is propelled to the skin for transpiration, where the pores (having been instantly collapsed at the time of the water's taking effect) are so closely obstructed that its passage to the surface is rendered impracticable. In this situation it becomes united with the perspirable matter already confined there; and is, in the course of time, compelled by the progress of internal inflammation to make its way through the skin; upon which it at last appears in a variety of forms and different symptoms, assuming distinct degrees of malignancy, according to the state, habit, and constitution of the subject at the time of attack.

Such, in substance, is Mr Taplin's account of this disorder. The indications of cure are, To resolve the inflammatory crudities, remove cutaneous obstruction, correct the acrimony of the blood, and gently quicken the circulation. The better to effect these, he directs to take away a moderate quantity of blood, that the impetus may be encouraged; to open the body with a few warm mashes; and according to the mildness or in-

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rectory,
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Hide-bound, Surfeits, &c. inveteracy of its appearance, to give either two or three mercurial purges, composed of the following ingredients.

BARBADOES aloes one ounce, jalap (in powder) three drams; calomel, cream of tartar, Castile soap, and ginger (in powder) of each two drams; with syrup of buckthorn sufficient to make a ball.

The doses must be given at proper intervals; particular care being all the while taken to guard against cold on account of the mercury contained in the composition. In three days after the last dose, a course of alteratives must be entered upon, the medicine composed as follows.

ANTIMONY levigated and sulphur each half a pound, Æthiop's mineral and cream of tartar each four ounces. These are to be mixed well together, and divided into twelve equal parts of two ounces each, for twelve doses; one of which must be given every night with the feed of corn; the latter being first sprinkled with water, the better to retain the powders.

These must be continued with the utmost punctuality for a month; during all which time let there be also given two ounces of nitre every morning in a pail of soft water. Should any trifling eschars, scabs, or excoriations, prove obstinate upon any part of the body, they may be washed with equal parts of lye (procured from the soap boilers) and lime-waters.

If in the course of a month no considerable advantage should be produced by the above prescriptions, the doses must be gradually increased from two ounces to two and an half, and in another week to three ounces for each dose, of both the composition and the nitre.

3. *Mange* is a distemper so universally known as to render a particular description unnecessary. It proceeds chiefly from poor feeding: hence it is very little seen amongst horses of any estimation; but is almost entirely confined to the lower class of stables and proprietors.

In a mangy horse the skin is generally tawny, thick, and full of wrinkles, especially about the mane, the loins, and tail; and the little hair that remains in those parts stands almost always straight out or bristly; the ears are commonly naked and without hair, the eye and eye-brows the same; and when it affects the limbs, it gives them the same aspect: yet the skin is not raw, nor peels off, as in the surfeit.

Where this distemper is caught by infection, if taken in time it is very easily cured: and a sulphur ointment is recommended as most effectual for that purpose, rubbed in every day. To purify and cleanse the blood, give antimony and sulphur for some weeks after. There are a great variety of external remedies for this purpose, such as train-oil and gunpowder, tobacco steeped in chamber lye, &c. most of them evidently improper. Soleseyl recommends the following, which has been approved.

TAKE burnt alum and borax in fine powder of each two ounces, white vitriol and verdigris powdered of each four ounces; put them into a clean pot, with two pounds of honey, stirring till they are incorporated; when cold, add two ounces of strong aquafortis.

But when this disorder, as is generally the case, is

contracted by low feeding and poverty of blood, the diet must be mended, and the horse properly indulged with hay and corn. With this view, there must be a constant supply of warm mashes, prepared with half malt and half bran, or equal parts of oats and bran, with four ounces of honey dissolved in each: let these be given night and morning, with a feed of dry corn every day at noon. During this treatment (which must be continued a week, to sheathe the acrimony of the fluids, and soften the rigidity of the skin) give one ounce of sulphur in each mash, and one ounce of nitre in water every night and morning. In a week or ten days, when the frame becomes more invigorated, discontinue the mashes, and let the diet be changed to good oats and sweet hay; giving, in the morning and evening feeds, one of the following powders, intermixed with the corn first sprinkled with water:

SULPHUR and prepared antimony each a pound, rubbed well together in a mortar, and then divided into 24 equal parts for as many doses.

Or, Antimony levigated and sulphur of each 12 ounces, liver of antimony and cream of tartar each half a pound.—These to be mixed well together, and divided into the same number of doses as the former.

As to the external treatment; previous to the commencement of the mashes, procure a pail of warm water and a quarter of a pound of soft soap (tied up in a linen rag), and with this forming a strong lather, let every infected part be thoroughly washed and cleansed, so that no scurf or filth be left upon the surface; then rub tenderly, dry with a coarse cloth or separated haybands; and on the following morning begin to rub in upon every part affected a due portion of the following ointment.

WEAK mercurial ointment half a pound, quicksilver four ounces, white hellebore (in powder) three ounces, black pepper (in powder) and oil of tartar each one ounce; with olive oil sufficient to make it of a proper softness.

The unction must be repeated for seven days, ten days, or a fortnight, according to the urgency of the symptoms; and let the powders before mentioned, with the nitre also, be continued for three weeks or a month. Lastly, as soon as the horse appears in a condition to bear it, take away a moderate quantity of blood, and give him afterwards two very mild doses of physic.

SECT. XXIV. *Of the Farcin or Farcy.*

THE true farcy is properly a disorder of the blood-vessels and their contained fluid; by which, when inveterate, the coats and integuments are so thickened that they become like so many cords.

At first, one or more small swellings, or round buds like grapes or berries, spring out over the veins, and are often exquisitely painful to the touch; in the beginning they are hard, but soon turn into soft blisters, which when broke discharge an oily or bloody ichor, and turn into very foul and ill-disposed ulcers. In some horses it appears on the head only; in some on the external jugular; in others on the plate-vein, and runs downwards on the inside of the fore-arm towards the knee, and very often upwards towards the brisket: in some the farcy shows itself on the hind-parts, about the paxerns, and along the large veins on

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the inside of the thigh, rising upwards into the groin, and towards the sheath; and sometimes it makes its appearance on the flanks, and spreads by degrees towards the lower belly, where it often becomes very troublesome.

When the farcy appears on the head only, it is easily cured; especially when it is seated in the cheeks and fore-head, the blood-vessels being here small: but it is more difficult when it affects the lips, the nostrils, the eyes, the kernels under the jaws, and other soft and loose parts, especially if the neck-vein becomes corded. When it begins on the outside of the shoulder or hips, the cure is seldom difficult; but when the farcy arises on the plate-vein, and that vein swells much, and turns corded, and the glands or kernel under the arm-pit are affected, it is hard to cure; but more so when the crural veins within side of the thigh are corded, and beset with buds, which affects the kernels of the groin and the cavernous body of the yard. When the farcy begins on the pasterns or lower limbs, it often becomes very uncertain, unless a timely stop is put to it; for the swelling in those dependent parts grow so excessively large in some constitutions, and the limbs so much disfigured thereby with foul sores and callous ulcerations, that such a horse is seldom fit for any thing afterwards but the meanest drudgery; but it is always a promising sign, wherever the farcy happens to be situated, if it spreads no further. It is usual to affect only one side at a time; but when it passes over to the other, it shows great malignancy: when it arises on the spines, it is then for the most part dangerous; and is always more so to horses that are fat and full of blood, than to those that are in a more moderate case. When the farcy is epidemical, as sometimes happens, it rises on several parts of the body at once, forms nasty foul ulcers, and makes a profuse running of greenish bloody matter from both nostrils; and soon ends in a miserable rot.

When the farcy makes its first appearance on the head, it rises on the cheeks and temples, and looks like a net-work, or small creeping twigs full of berries. Sometimes it inflames the eye, and sometimes little blisters or buds run along the side of the nose. It arises often on the outside of the shoulder, running along the small veins with heat and inflammation; and sometimes a few small buds appear near the withers, and on the outside of the hips. In all these appearances, the disease being superficial, and affecting only the smaller vessels, is easily conquered by the following method, when taken in time; for the simplest farcy, if neglected, may degenerate into the worst sort.

This distemper, then, being of an inflammatory nature, and in a particular manner affecting the blood-vessels, must necessarily require large bleeding, particularly where the horse happens to be fat and full of blood. This always checks the beginning of a farcy, but is of small service afterwards; and if a horse is low in flesh, the loss of too much blood sometimes proves injurious. After bleeding, let the horse have four ounces of cream of tartar and lenitive electuary; which may be given every other day for a week, to cool the blood and the body; and then give nitre three ounces a-day for three weeks or a month, and anoint the buds or swellings with the following ointment twice a-day.

TAKE ointment of elder four ounces, oil of turpen-

tine two ounces, sugar of lead half an ounce, white vitriol powdered two drams; mix together in a gally-pot.

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The buds sometimes by this method are dispersed, leaving only little bald spots which the hair soon covers again. When they break and run, if the matter be thick and well digested, they will soon be well: but in order to confirm the cure, and to disperse some little lumps which often remain for some time on the skin without hair, give the liver of antimony for a month; two ounces a-day for a fortnight, and then one ounce a-day for the other fortnight: by following this method, a farcy which affects only the small vessels may be stopped in a week or ten days, and soon after totally eradicated.

When the farcin affects the larger blood-vessels, the cure is more difficult; but let it always be attempted early; therefore, on the plate, thigh, or neck-veins appearing corded, bleed immediately on the opposite side, and apply the following to the corded vein.

TAKE oil of turpentine in a pint-bottle six ounces, oil of vitriol three ounces; drop the oil of vitriol into the oil of turpentine by little at a time, otherwise the bottle will burst; when it has done smoking, drop in more oil of vitriol, and so on till all is mixed.

This mixture is one of the best universals in a beginning farcy; but where it is seated in loose fleshy parts, as flanks or belly, equal parts of the oil of vitriol and turpentine are necessary.

Rub the parts first with a woollen cloth, and then apply some of the mixture over the buds, and wherever there is any swelling, twice a-day. Give the cooling physic every other day, and then three ounces of nitre every day for some time.

When the farcy begins on the flanks, or towards the lower belly, it often takes its rise from a single puncture of a sharp spur. The pain and smarting is one sure sign to distinguish the farcy from common accidents; the staring of the hair, which stands up like a tuft all round the buds or blisters, and the matter that issues from the buds, which is always purulent and of a clammy greasy consistence, are other certain signs. After bathing with the mixture abovementioned till the ulcers are smooth and healing, should the swelling not subside, to prevent the spreading of the buds, and to disperse them, bathe with either of these mixtures as far as the centre of the belly; and at the same time give a course of antimonials as will presently be prescribed.

TAKE spirits of wine four ounces, oil of vitriol and turpentine of each two ounces, white-wine vinegar or verjuice six ounces.

Or the following:

TAKE spirits of wine rectified four ounces, camphor half an ounce, vinegar or verjuice six ounces, white vitriol dissolved in four ounces of spring-water one ounce, mix together.

In the lower limbs the farcy lies sometimes concealed for a great while; and makes so slow a progress, that it is often mistaken for grease, or for a blow or kick, and goes by the general appellation of a *humour settled there*. In order to distinguish the one from the other, we shall observe, that a kick or bruise is generally attended with a sudden swelling, or a contused wound,

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wound, which for the most part digests easily: the greafe is also a smooth swelling that breaks out above the bending of the pasterns backwards; but the farcy begins on the pastern joint usually with one bud, and runs upwards like a knotty crab-tree.

Very simple means have sometimes stopped it, before it has begun to spread; a poultice with bran and verjuice bound round the part and renewed once a-day will often alone succeed; and if proud flesh should arise, touch it with oil of vitriol, or aquafortis, an hour before you apply the poultice; for when the distemper is local, as we suppose it here, it is to be conquered by outward applications.

The following balls are proper in every state of the farcy; and when the distemper has been in its infancy, before the skin was much defaced, has often cured it in a week or two, by giving them only once or twice a-day: but in an old farcy they should be given for two or three months together.

TAKE of native cinnabar, or cinnabar of antimony, eight ounces; long bithwort and gum guaiacum powdered, of each four ounces: make into a paste with honey, and form into balls of the size of a large walnut, and roll them into liquorice-powder.

The tediousness of this course has encouraged the giving of mercurials; and indeed, where they are directed with skill, they must be attended with success: the stronger preparations, as the red and white precipitates, and turbith, being combined with sharp saline parts, may be hazardous and injurious; but the latter given in small quantities have been found very successful in such kind of inveterate disorders. Mr Gibson says, he has given it to a dram at a dose, where the limbs have been greatly swelled; that in 48 hours the sores were all dried up, and the limbs reduced: but that it made the horse so violently sick for several days, and scoured him to such a degree, that it could not be repeated.

Mr Bartlet observes, that the success attending this medicine so suddenly ought to have encouraged Gibson to have made further trials in smaller quantities; which had he done, it is more than probable he would not have been disappointed; for the grand secret in giving mercurials as alteratives, is the introducing them into the blood, without operating on the stomach and bowels; and to do this effectually, they must be given in small quantities, and so bridled as to controul their force on the first passages; taken in this manner, they will mix gradually with the blood and juices, and operate both effectually and safely.

Dr Braken recommends the knots and cords to be rubbed with the mercurial ointment before they break, in order to disperse them; and after breaking, to dress the sores with equal parts of Venice turpentine and quicksilver; if by these means the mouth should become sore, treat as above. This method seems to be effectual, with proper care.

The following is also recommended by the same gentleman:

TAKE butter of antimony and bezoar mineral, of each one ounce; beat up with half a pound of cordial ball; and give the bigness of a walnut, or three quarters of an ounce, every day for two or three weeks, fasting two or three hours after it.

The following mode of treatment and forms of medicine are prescribed by Mr Taplin†.

Upon the very earliest appearance of the disorder, blood is to be taken away in sufficient quantity. If the horse is in high condition and full of flesh, give him mashes through the day of bleeding and the next day; and on the following morning a purging ball composed of socotorine aloes ten drams, calomel and jalap (in powder) each two drams and a half, rhubarb and ginger of each a dram and a half, with syrup of buckthorn or roses sufficient to form the ball. Let the purge be carefully attended to, and duly worked off. If the physic works favourably, and sets well, let his feed (if his appetite is keen for four clear days) be plentiful, and on the fifth or sixth at farthest repeat his purging ball. If the attack has been violent, or the disorder makes rapid progress, a third dose must be given in like manner. In two days after the course is completed, it is directed to begin upon the following antimonial alteratives, assisted by a regular administration of nitre; both to be continued a month without the most trifling intermission:

PREPARED antimony one pound, common sulphur twelve ounces, cream of tartar eight ounces, and cinnabar of antimony six ounces:

Which being incorporated well in a mortar, is to be divided into twenty equal parts. Of these, one is to be given every night in the corn, first sprinkling with water to ensure its adhesion, and two ounces of nitre are to be mixed with the water every morning, at which time he will generally drink it with the greater avidity as being most thirsty. The buds or swelling upon their first appearance may be well washed with the following twice every day, with a lotion composed of extract of Saturn two ounces, camphorated spirit of wine eight ounces, and distilled vinegar a pint; mixed well together, and kept close stopp'd for use.

In a more advanced or inveterate stage of the distemper, moderate bleeding should be repeated at proper intervals between the physic; and upon the scabs or eschars peeling from the buds, wash them well occasionally with the following:

To two drams of corrosive mercury dissolved in half a pint of British brandy, add a pint of white-wine vinegar, half a pint of spring water, and two ounces of tincture of myrrh; shaking well together.

Or, Sugar of lead and white vitriol each an ounce, distilled vinegar and spring water each one pint, styptic tincture three ounces, well mixed together.

If the ulcers should continue foul, and their edges become callous, very small quantities of the strong mercurial ointment must be gently rubbed into the centre of the most inveterate, once in three or four days, cleansing them occasionally with one of the washes before mentioned. In this case one of the following balls must be given regularly every morning for a month or longer if necessary. The proportion of nitre must be altered to three ounces, and given in the water every evening, the ball being administered in the morning.

Mercurial alterative Ball. TAKE Æthiops mineral four ounces, milk of brimstone, prepared antimony, cream of tartar, and cinnabar of antimony, each five ounces; honey sufficient to make a mass; which

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† P. 141.

which divide into a dozen equal balls, and roll up in liquorice or aniseed powder.

It may not be improper now to add the symptoms of an incurable farcy, that the owners of such horses may save themselves unnecessary expense and trouble in their endeavours to obtain a cure. When a farcy, by improper applications, or by neglect, has spread and increased, or after long continuance resisted the medicines above recommended; if fresh buds are continually spouting forth, while the old ones remain foul and ill-conditioned; if they rise on the spines of the back and loins; if the horse grows hide-bound, and runs at the nose; if abscesses are formed in the fleshy parts between the interstices of the large muscles; if his eyes look dead and lifeless; if he forsakes his food, and scours often, and his excrements appear thin and of a blackish colour; if the thigh or plate vein continues large and corded after firing and other proper applications; these symptoms denote the distemper to have penetrated internally, and that it will degenerate into an incurable consumption: it is most probable also that the whole mass of fluids are tainted, and become irremediable by art.

Before closing this section, it is proper to take notice of what is called the *water farcy*; which has no resemblance to a true farcy either in its cause, symptoms, or effects, but has only obtained this name through custom and ignorance.—This water-farcy, then, is of two kinds: one the product of a feverish disposition, terminating on the skin, as often happens in epidemical colds; the other is dropical, where the water is not confined to the belly and limbs, but shows itself in several parts of the body by soft swellings yielding to the pressure of the finger. This last kind usually proceeds from foul feeding, or from the latter grafts and fog that often comes up in great plenty with continued cold rains, and breeds a sluggish viscid blood. In the former case, we have seen the limbs and whole body enormously swelled, and very hard, the belly and sheath greatly distended; which were as surprisingly reduced in 24 hours, by slight scarifications within-side the leg and thigh with a sharp penknife, and three or four strokes on the skin of the belly on each side the sheath: from these scarifications there was a constant and surprising large dripping of water, which soon relieved the horse; when a few purges completed his recovery.

In the other species of dropsy the curative intentions are to discharge the water, recover the crasis or strength of the blood, and brace up the relaxed fibres throughout the whole body. To this end purge once a-week or ten days; and give intermediately either of the following.

TAKE black hellebore fresh gathered, two pounds; wash, bruise, and boil in six quarts of water to four; and then strain out the liquor, and put two quarts of white-wine on the remaining hellebore, and let it infuse warm 48 hours: then strain off, mix both together, and give the horse a pint night and morning.

TAKE nitre two ounces, squills powdered three drams or half an ounce, camphor one dram, honey enough to form into a ball, to be given once a-day alone, or washed down with a horn or two of the above drink.

In all strains, the muscular or tendinous fibres are overstretched; and sometimes ruptured or broke. To form, therefore, a true idea of these disorders, let us first consider every muscle and tendon as composed of springy elastic fibres, which have a proper power of their own to contract and extend themselves; or, to make their action more familiar, let us compare them to a piece of catgut, that we may the better judge with what propriety oily medicines are directed for their cure. Thus, then, if, by a violent extension of this catgut, you had so overstretched it as to destroy its springiness or elasticity, and was inclined to recover its lost tone, would you for that purpose think of soaking it in oil? And is not the method of treating strains, or overstretched muscles and tendons, full as preposterous, when you bathe or soak them in oily medicines, at a time that they want restringents to brace them up? Yet custom has so established this practice, and fallacious experience seemingly so confirmed it, that it would be a difficult task to convince the illiterate and prejudiced of the absurdity, who, by attributing effects to wrong causes, are led into this error, and the oils usurp the reputation that is due only to rest and quiet: they seem, however, to be aware of the ill consequences, by their adding the hot oils, as spike, turpentine, and origanum; which, though they in some measure guard against the too suppling quality of the other oils, yet the treatment is still too relaxing to be of real service.

And indeed, in all violent strains of either tendons or muscles, whatever opinion we may entertain of bathing and anointing with favourite nostrums, which often succeed in slight cases, where perhaps bandage alone would have done; yet it is the latter, with proper resting the relaxed fibres till they have thoroughly recovered their tone, that are the chief things to be depended on; and frequently some months necessary for effecting the cure.

All violent strains of the ligaments, which connect the bones together, especially those of the thigh, require time, and turning out to grass, to a perfect recovery. External applications can avail but little here, the parts affected lying too deep, and so surrounded with muscles that medicine cannot penetrate to them. The sooner, in these cases, a horse is turned out to grass, the better; as the gentle motion in the field will prevent the ligaments and joint oil from thickening, and of course the joint itself from growing stiff.

When a horse's shoulder is overstrained, he does not put out that leg as the other; but, to prevent pain, sets the sound foot hardily on the ground to save the other; even though he be turned short on the lame side, which motion tries him the most of any. When trotted in hand, instead of putting his leg forward in a right line, he forms a circle with the lame leg; and when he stands in the stable, that leg is advanced before the other.

In order to cure this lameness, first bleed him, and let the whole shoulder be well bathed three times a-day with hot verjuice or vinegar, in which may be dissolved a piece of soap; but if the lameness continues without swelling or inflammation, after resting two or three days, let the muscles be well rubbed for a considerable

Strains. derable time, to make them penetrate, with good opodeldoc, or either of the following mixtures.

TAKE camphorated spirit of wine two ounces, oil of turpentine one ounce; this proportion will prevent the hair coming off.

Or, TAKE the best vinegar half a pint, spirit of vitriol and camphorated spirit of wine of each two ounces.

When the shoulder is very much swelled, it should be fomented with woollen cloths (large enough to cover the whole) wrung out of hot verjuice and spirit of wine; or a fomentation prepared with a strong decoction of wormwood, bay-leaves, and rosemary, to a quart of which may be added half a pint of spirit of wine.

A rowel in the point of the shoulder in this case often does great service; especially if the strain has been very violent, and the swelling very large: but as to boring up the shoulder with a hot iron, and afterwards inflating it, is both a cruel and absurd treatment: and the pegging up the sound foot, or setting on a patten shoe, to bring the lame shoulder on a stretch, is a most preposterous practice, and directly calculated to render a horse incurably lame; for it can only be necessary in cases the very opposite to this, where the muscles have been long contracted, and we want to stretch them out.

Where poultices can be applied, they are at first undoubtedly very effectual, after bathing with hot vinegar or verjuice; and are to be preferred greatly to cold charges, which, by drying so soon on the part, keep it stiff and uneasy: let them be prepared with oatmeal, rye-flour, or bran boiled up in vinegar, strong-beer or red-wine lees, with lard enough to prevent their growing stiff; and when by these means the inflammation and swelling is brought down, bathe the part twice a-day with either of the above mixtures, opodeldoc, or camphorated spirit of wine; and roll the part three or four inches, both above and below, with a strong linen roller of about two fingers width; which contributes not a little to the recovery, by bracing up the relaxed tendon; and perhaps is more to be depended on than the applications themselves.

In the strains of the *coffin joint*, that have not been discovered in time, there will grow such a stiffness in the joint, that the horse will only touch the ground with his toe; and the joint cannot be played with the hand: the only method here is repeated blistering, and then firing superficially.

Strains of the *back sinews* are very common; and are easily discovered by the swelling, which extends sometimes from the back-side of the knee down to the heel, but for the most part the horse sets that foot before the other. The tendon should be well bathed three or four times a-day with hot vinegar; and if much swelled, apply the poultices above recommended; and when the swelling is down, bathe with the mixtures above, or with camphorated spirit of wine and oil of amber, in which is dissolved as much camphor as the spirits will take up; and roll up the tendon with a proper bandage or laced stocking; which last, properly fitted to the limb, might be wore to great advantage, not only in these sort of injuries, but in most others, where there is a disposition to the grease, or other swellings of the limbs, from weak and relaxed fibres. Curriers shavings wetted with vinegar have been found

useful for this purpose; as has also tar and spirit of wine: but where the tendons have suffered by repeated injuries of this kind, the case will demand blistering, firing, and proper rest.

Strains of the *knees* and *pasterns* arise frequently from kicks or blows: if they are much swelled, apply first the poultices; and when the swelling is abated, bathe with the above, or the following.

TAKE vinegar one pint, camphorated spirit of wine four ounces, white vitriol dissolved in a little water two drams.

Or, TAKE the white of three or four eggs, beat them into a froth with a spoon; to which add an ounce of rock alum finely powdered; spirit of turpentine and wine of each half an ounce; mix them well together.

As great weakness remains in the pasterns after violent strains, the best method is to turn the horse out to grass till he is perfectly recovered; when this cannot be complied with, the general way is to blister and fire.

When a horse is lame in the *stifle*, he generally treads on his toe, and cannot set the heel to the ground. Treat him at first with the vinegar and cooling restringents: but if a large swelling, with puffiness, ensues, foment it well with the discutient fomentation till it disperses; and then bathe the part with any of the above medicines.

A lameness in the *whirl-bone* and hip, is discovered by the horse's dragging his leg after him, and dropping backward on his heel when he trots. If the muscles of the hip are only injured, this kind of lameness is cured easily: but when the ligaments of the joint are affected, the cure is often very difficult, tedious, and uncertain. In either case, at first bathe the parts well with the cooling medicines, four or five times a-day in the muscular strain, this method alone may succeed; but in the ligamentous, it is rest and time only can restore the injured parts to their proper tone.

Strains in the *hock* are to be treated by soaking the parts with coolers and repellers; but when the ligaments are hurt, and they are attended with great weakness and pain, use the fomentation. If a hardness should remain on the outside, it may be removed by repeated blistering; if within, it may be out of the power of any external applications to remove: however, the joint should be fired gently with small razes or lines pretty close together, and then covered with a mercurial plaster. To the discutient fomentation above-mentioned may be added crude sal ammoniac, with a handful of wood-ashes boiled in it.

The blistering ointment for the above purposes may be found in the Section of *Bone spavin*; but the sublimate should be omitted.

The firing, so generally used for the strengthening relaxed sinews or tendons, is made to act upon different parts according to the different notions of the operator. Most usually it is intended to act only on the skin, which by contracting and hardening it all round the sinews, compresses them more firmly like a bandage. The bowmen of old, it is alledged, submitted to this operation, in order to give strength to the muscles and tendons of their arms. Upon this principle, a proper degree of skill is very requisite to perform it effectually

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effectually on a horse, for a due medium should be observed, and the instrument neither so slightly applied as to scarify the skin only superficially, nor so deep as to wound or cauterise the sinew or its sheath. The lines should be drawn pretty close together, on each side, of the joint or sinew, following the course of the hair; no cross lines should be made, as they but disfigure the horse afterwards, without any real use. The firing instrument, or knife, ought to be a little rounded on the edge, gradually thickening to the back, that it may retain the heat for some time, but should not be applied till the inflaming redness is partly gone off. The cauterized parts may be bathed with spirit of wine at first; and anointed afterwards with bees-wax and oil, which alone is sufficient to complete the cure. But, in every view, this operation deserves to be condemned, upon the following judicious observations of Osmer. "Between the tendon and the skin of the leg, as nothing intervenes but a thin membrane, what hand can determine betwixt the boundaries of those bodies, whose appearance, by the heat of the iron, is made undistinguishable to the eye? Now mark the event of firing. If the fire reaches no further than the skin, little advantage can accrue to the tendon, but the fibres of the skin will become contracted and less pliant; if the fire reaches the membrane or sheath of the tendon some of its glands are destroyed, and the tendon becomes more or less rigid. If the tendon be burnt, the consequence will be still worse; and in either case the velocity of motion will be impeded: on all these occasions the horse should be turned to grass and indulged with proper rest, that the diseased parts may recover their former firmness, tone, and strength."

SECT. XXVI. Of Tumors and Imposthumes.

TUMORS, or swellings, arise either from external injuries or internal causes.

I. Swellings caused by external accidents, as blows and bruises, should at first be treated with restringents: Thus, let the part be bathed frequently with hot vinegar or verjuice; and, where it will admit of bandage, let a flannel wetted with the same be rolled on: if by this method the swelling does not subside, apply, especially on the legs, a poultice with red wine lees, strong-beer grounds, and oatmeal, or with vinegar, oil, and oatmeal: either of these may be continued twice a-day, after bathing, till the swelling abates: when in order to disperse it entirely, the vinegar should be changed for camphorated spirit of wine, to four ounces of which may be added one of spirit of sal ammoniac; or it may be bathed with a mixture of two ounces of crude sal ammoniac boiled in a quart of chamber-lye twice a-day, and rags dipped in the same may be rolled on.

Fomentation made by boiling wormwood, bay-leaves, and rosemary, and adding a proper quantity of spirits, are often of great service to thin the juices, and fit them for transpiration; especially if the injury has affected the joints.

But in bruises, where the extravasated blood will not by these means be dispersed, the shortest way is to open the skin, and let out the grumes.

Critical tumors or swellings, which terminate fevers, should by no means be dispersed; except when they fall on the pastern or coffin joint, so as to endan-

ger them: in this case the discutient fomentation, (p. 143. col. 1.) should be applied three or four times a-day, and a cloth or flannel frequently wrung out of the same should be bound on, in order to keep the joint continually breathing.

But all tumors tending to a certain maturation (from whatever cause they originated), should be expeditiously assisted by fomentation as already directed; and, after each time of using the fomentation, the ripening encouraged by suppurating poultices wherever they can be applied: oatmeal boiled soft in milk, to which a proper quantity of oil and lard is added, may answer this purpose; or the poultice recommended in the Section of *Strangles*. These applications must be regularly continued till the matter is perceived to fluctuate under the fingers, when it ought to be let out; for which purpose, let the tumor be opened with a knife or strong lancet, the whole length of the swelling, if it can be done safely; for nothing contributes so much to a kind healing as the matter's having a free discharge, and the opening's being big enough to dress to the bottom.

Pledgets of tow or lint spread with black or yellow basilicon (or the wound ointment), and dipped in the same, melted down with a fifth part of oil of turpentine, should be applied to the bottom of the sore, and filled up lightly with the same, without cramping: it may be thus dressed once or twice a-day, if the discharge is great, till a proper digestion is procured; when it should be changed for pledgets spread with the red precipitate ointment, applied in the same manner.

Should the sore not digest kindly, but run a thin water and look pale, foment, as often as you dress, with the above fomentation; and apply over your dressing the strong-beer poultice, and continue this method till the matter grows thick, and the sore florid.

The following ointments will generally answer your expectations in all common cases; and may be prepared without, as well as with verdigrease.

TAKE Venice turpentine and bees-wax of each a pound, oil of olives one pound and a half, yellow rosin 12 ounces; when melted together, two or three ounces of verdigrease, finely powdered, may be stirred in, and kept so till cold, to prevent its subsiding.

TAKE of yellow basilicon, or the above ointment, without verdigrease, four ounces; red precipitate, finely powdered, half an ounce: mix them together cold with a knife or spatula.

This last, applied early, will prevent a fungus, or proud flesh, from shooting out: for if you dress too long with the above digestive, the fungus will rise fast, and give some trouble to suppress it; when it will be necessary to wash the sore, as often as you dress, with a solution of blue vitriol in water, or to sprinkle it with burnt alum and precipitate. If these should not be powerful enough, touch with a caustic, or wash with the sublimate water made by dissolving half an ounce of corrosive sublimate in a pint of lime-water.

But this trouble may in a great measure be prevented, if the sore is on a part where bandages can be applied with compresses of linen-cloth: for even when these excrescences regerminate, as it were, under the knife, and spring up in spite of the caustics above-mentioned,

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mentioned, they are to be subdued by moderate compression made on the sprouting fibres by these means.

As soon as the wound is skinned over, throwing aside all greasy applications, let the surface be hardened first with equal parts of tincture of myrrh and vinegar, afterwards with tincture of myrrh alone. If any eschar of consequence should remain, and the hair not follow kindly, rub the part gently every night with a small quantity of camphorated spermaceti ointment, the best article known to promote the return of the hair upon the knees or any other part.

Authors on farriery have given in general very proper receipts to answer every intention of this kind by medicines: but as they have not laid down sufficient rules for their application in those cases where they are most wanted, the following general directions will not be unacceptable; as the difficulty in healing some kinds of sores arises frequently from the unskilful manner of dressing them.

It may be necessary then to observe here, once for all, that the cures of most sores are effected by the simplest methods; and that it is often of much more consequence to know how to dress a sore, than what to dress it with. And in this consists indeed the chief art of this branch of surgery: for the most eminent in that profession have long since discovered, that variety of ointments and salves are unnecessary in the cure of most wounds and sores; and they have accordingly discarded the greatest part formerly in repute for that purpose; repeated observations have taught them, that, after the digestion, nature is generally disposed to heal up the wound fast enough herself; and that the surgeon's chief care is to prevent a luxuriancy, commonly called *proud flesh*; which all ointments, wherein lard or oil enters, are but too prone to encourage, as they keep the fibres too lax and supple; and which dry lint alone, early applied, as easily prevents, by its absorbing quality, and light compression on the sprouting fibres.

Thus, if a hollow wound or sore is crammed with rents, or the dressings are applied too hard, the tender shoots of flesh from the bottom are prevented pushing up; and the sides of the sore from this distension may in time grow horny and turn fistulous; nor has the matter by this method a free discharge.

On the other hand, if sores of any depth are dressed superficially, the external parts being more disposed to heal and come together than the internal, they will fall into contact, or heal too soon; and the sore, not filling up properly from the bottom, will break out afresh.

Hence we may justly conceive how little stress is to be laid on famous ointments, or family salves, unskilfully applied, for unless this due medium is observed, or obtained in the dressing, no hollow sore can heal up properly.

As soon then as a good digestion is procured (which is known by the thickness and whiteness of the matter discharged, and the florid red colour at the bottom of the sore), let the dressings be changed for the precipitate medicine; or the sore may be filled up with dry lint alone, or dipped in lime-water, with a little honey and tincture of myrrh, or brandy, about a fifth part of the latter to one of the former: a pledget of lint, dipped in this mixture, should also be applied to the bottom of the sore, which should be filled up with

others to the surface or edges, but not crammed in too hard, as before observed, nor yet applied too loosely.

By this method the sore would incarnate, or heal up properly, and soft spongy flesh would be prevented or suppressed in time; whereas when ointments or salves are too long continued, a fungus, or proud flesh, is thereby so encouraged in its growth, that it requires some time to destroy and eat it down again: a proper compress of cloth, and a linen roller, is absolutely necessary both for this purpose and to secure on the dressings, wherever they can conveniently be applied.

2. Scrofulous tumors are such as originate in scorbutic or hereditary taints, and increase or diminish according to the state or acrimony of the blood. For these the principal application is the strongest mercurial unguent, thus prepared.

QUICKSILVER two ounces, lard six ounces, balsam of sulphur half an ounce. The quicksilver to be rubbed with the balsam in a metal mortar till the globules disappear; then the lard (first made warm) to be added by degrees.

The use of this unguent must be assisted by a course of mercurial and antimonial alteratives.

3. The other tumors that may be here noticed are, the cedematous, steatomatous, and encysted. The cedematous and encysted tumors are nearly synonymous, originating in a cyst or bag, containing a kind of ichorous bloody sanies or gelatinous fluid; which being evacuated, the cyst does not always submit to digestives or eschorotics, but must be extirpated with the knife, and cured as a common wound.

The steatomatous are those tumors that form on different parts, and pass in general under the denomination of *wens*, containing, when opened or extracted, a substance not unlike suet when hardly cold.

Neither of the above are expected to submit to any topical application, unless upon the very first observation; when an attempt may be made by the most powerful repellents, and a small portion of the above mercurial ointment rubbed in every night, for a considerable length of time; but no radical cure can be in general obtained but by instrumental extirpation; and as this must be unavoidably attended with loss of time, and a proportional share of danger, if seated upon or intersected by the muscular parts, perhaps it may be most prudent to omit the experiment and submit it to chance.

SECT. XXVII. Of Wounds in general.

In all fresh wounds made by cutting instruments, there is nothing more required than bringing the lips of the wound into contact by suture or bandage, provided the part will allow of it; for on wounds of the hips, or other prominent parts, and across some of the large muscles, the stitches are apt to burst on the horse's lying down and rising up in the stall. In such cases, the lips should not be brought close together: one stitch is sufficient for a wound two inches long; but in large wounds, they should be at an inch or more distance; and if the wound is deep in the muscles, care should be taken to pass the needles proportionably deep, otherwise the wound will not unite properly from the bottom.

Should the wound bleed much from an artery divided, the first step should be to secure it, by passing a crooked needle underneath, and tying it up with a

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waxed

Wounds in waxed thread: if the artery cannot be got at this way, *General.* apply a button of lint or tow to the mouth of the bleeding vessels, dipped in a strong solution of blue vitriol, styptic water, oil of vitriol, or hot oil of turpentine, powdered vitriol, or colcothar, &c. and remember always to apply it close to the mouth of the bleeding vessels, and take care that it is kept there by proper compress and bandage till an eschar is formed; otherwise it will elude your expectations, and frequently alarm you with fresh bleedings.

In a memoir presented to the Royal Academy of Sciences by M. La Fosse, he gives an account of the success he had met with in stopping the bleedings of very considerable arteries in horses, by the application of the powder of puff-balls, the arteries cicatrizing by this means only, without any succeeding hæmorrhage. The lycoperdon, or puff-ball, was made use of for this purpose in human subjects, about 170 years ago, by Felix Wurtz, a famous old surgeon in Germany; but he does not seem to have thought of trusting to it in such considerable arteries as M. La Fosse mentions, viz. those of the leg and thigh, the bleedings from which divided vessels he stopt in a few minutes by the use of this powder only. The agaric of the oak may also be used for this purpose, where it can be retained by a proper bandage.

These applications, as indeed all styptics, seem to act by constringing the extremity of the vessel, or choaking it up, till a grume of blood is formed internally, which plugs up the orifice; and has been found to adhere to it so as to constitute one body with the vessel.

We avoid setting down any famous receipts for fresh wounds, whether ointments, or Friar's balsams, being well assured, that, in a healthy sound constitution, nature furnishes the best balsam, and performs herself the cure, which is so often attributed to the medicine; when it is otherwise, and the blood is deprived of its balsamic state, as will appear from the aspect of the wound and its manner of healing, it must be rectified by proper internal medicines, before a good foundation for healing can be laid by any external application whatever.

The lips of the wound then being brought together by the needle or bandage, it needs only to be covered with rags dipped in brandy, or a pledget of tow spread with the wound ointment, (see page 144. col. 2.) the directions in the preceding sections being observed, and the wounded part kept as much as possible from motion.

Punctured wounds from thorns, or any other accident, should be treated in the same manner; applying the beer or bread and milk poultice over the dressing, till some signs of digestion appear; and fomenting the part well every day. This method is also very successfully used to those swellings which often arise on the neck from bleeding; the sores being sprinkled with precipitate, and burnt allum powdered, to fetch out the core or fungus, which choaks up the orifice. The usual method is to introduce a piece of vitriol, or sublimate, which often brings on a plentiful discharge, fetches out the core, and makes a cure; but it is often with the loss of the vein, and it sometimes leaves a large swelling and imposthumation.

In gun-shot wounds, when the ball has not pene-

trated too deep, it should be extracted, if it can be fetched away without disturbance, together with any extraneous bodies that might pass in with it; the wound should be dressed with the old digestive of Venice or common turpentine, divided with the yolks of eggs, to which may be added some honey and tincture of myrrh. The entrance of these wounds frequently requires to be enlarged, and a depending orifice should always be procured if possible; and if the wound should not digest kindly, apply the beer poultice, and foment with the discutient fomentation before mentioned.

In scalds, or burns from gunpowder, or any other cause, when the skin remains entire, bathe the part well, and keep it soaked with rags dipped in spirit of wine camphorated: salt bound thick on the part has been found very effectual for this purpose; and indeed all saline and spirituous applications excel others, while the skin is yet unbroke; but when the skin is separated, anoint the part, and keep it constantly supple with linseed or salad oil, and a plaster spread with bees-wax and oil; if the skin is so scorched, that sloughs must be digested out, dress with the wound-ointment and oil of turpentine, and finish the cure with any drying ointment. Should the horse be feverish from the pain, bleed him, give cooling glysters, and treat him as we have directed in simple fevers.

There are certain wounds which occur much more frequently than any other, and which from that circumstance, though in themselves not at all dangerous, deserve particular notice. Among these are broken knees, over-reaches, and lacerations between hair and hoof. In respect to the first, it is a misfortune whenever it happens that not only reduces the horse very much in his value, but is considered as an indelible stigma of imperfection, that (with connoisseurs) renders him at first sight unworthy a second consideration. This misfortune may sometimes be occasioned by unavoidable accident; but Mr Taplin is justly of opinion that more horses are thrown down and irremediably injured by the carelessness and shameful inattention of bad riders on bad roads and over rolling stones, or when they are more cruelly exhausted with labour and fatigue, than by any other means in the whole list of accidents.

In relieving this injury, the first step is to wash the parts well with a sponge and warm water, thoroughly cleansing the lacerations from gravel or sand; for these will evidently irritate and inflame the tender parts, and be productive of a discharge which may often be entirely prevented by gently wiping them dry after the use of the sponge, and plentifully embrocating them with a mixture of camphorated spirits and vinegar in equal quantities, bandaging over a pledget of tow wet with the same, and repeating it once or twice if circumstances should render it necessary. This should be continued, that an eschar or cicatrix may be formed to render unctuous or greasy applications unnecessary; but should the wound or laceration be so violent as to produce great inflammation, suppuration must ensue, and ought to be encouraged by the means already directed, and the sore healed in the manner also above directed.

As to over-reaches and other injuries in the feet, they are treated of in their order under *Diseases of the Feet*.

SECT.

Ulcers in
General.SECT. XXVIII. *Of Ulcers in General.*

WE shall not here enter into a description of each particular species of ulcers, but only lay down some directions for their general treatment; by which means we shall avoid the usual prolixity of authors on this subject, and yet give so general an idea of the nature of ulcers, as we hope will be sufficiently instructive both of the application and of the proper remedy to each.

It may be necessary to observe, that we may often in vain pursue the best methods of cure by external applications, unless we have recourse to proper internal remedies; for as all ulcers, difficult to heal, proceed from a particular indisposition of the blood and juices, before the former can be brought into any order, the latter must be corrected by alteratives and sweetening medicines.

The first intention in the cure of ulcers is bringing them to digest or discharge a thick matter; which will, in general, be effected by the green ointment, or that with precipitate; but should the sore not digest kindly by these means, but discharge a gleety thin matter, and look pale, you must then have recourse to warmer dressings, such as balsam, or oil of turpentine, melted down with your common digestive, and the strong-beer poultice over them; it is proper also in these kind of sores, where the circulation is languid, and the natural heat abated, to warm the part, and quicken the motion of the blood, by fomenting it well at the time of dressing; which method will thicken the matter, and rouse the native heat of the part, and then the former dressings may be re-applied.

If the lips of the ulcer grow hard or callous, it will be necessary to foment strongly with a decoction of camomile and mallows, as hot as can be conveniently applied; then scarify superficially the whole part, both longitudinally and transversely, with a fleam or abscess lancet, so as entirely to penetrate the callous substance upon the surface: after which it must be dressed with digestive ointment twice every day; the fomentations and scarifications to be repeated occasionally, if necessary, till the callosity is quite sloughed off, and comes away with the dressings. A proper ointment for the above purpose may be prepared as follows.

TAKE of yellow basilicon two ounces, and black basilicon one ounce, and melt them together over the fire. When taken off, stir in one ounce of turpentine; and when cool, add half an ounce of red precipitate finely powdered, the whole to be minutely incorporated upon a stone or marble slab.

As soon as the callosity is removed, and the discharge comes to its proper consistence, dress in general with a small portion of lint, thinly covered with either of the basilicons, placed under a pledget of tow spread with the following digestive:

YELLOW wax and black rosin each four ounces, Burgundy pitch two ounces; melt these in a pint of olive oil over a slow fire; and when taken off, stir in two ounces of turpentine. For large wounds, where a plentiful discharge is required, stir into this quantity three ounces of the spirits of turpentine, that it may incorporate in getting cool.

Should the wound incarnate too fast, and fill with fungous flesh, slightly touch such parts with a piece

of unslacked lime, regulating the mode and application by the necessity, and repeating it as occasion may require. When the cicatrix is nearly formed, the cure may be completed by hardening the surface with a little tincture of myrrh.

All sinuses or cavities, if no tendinous parts intervene, should be instantly laid open (with a bistory) to its utmost extent, and properly filled with a pledget of lint, well impregnated with warm digestive, and plentifully covered with tow spread with the same. After a second or third dressing, should the inside of such cavity prove callous or hard in substance, it must be taken away by the knife, or destroyed by the means before described. If it be so situated that the parts forbid an entire separation, sound with the probe, and at its extremity make a counter incision through the integuments to meet the probe, till by passing through, it removes any lodgment that may have been left for the matter to corrode, which it will very soon do, so as in many cases to affect the bone itself.

Where the cavity penetrates deep into the muscles, and a counter opening is impracticable or hazardous; where, by a continuance, the integuments of the muscles are constantly dripping and melting down; in these cases washes may be injected, and will frequently be attended with success. The following is particularly recommended by Mr Taplin.

TAKE honey and vinegar each two ounces; liquefy over the fire; and when cool add tincture of myrrh and tincture of cantharides each one ounce.
—Mix.

When the ulcer is by these means divested of its virulence and bad smell, the callosity sloughed off or extracted, and a favourable appearance of incarnation comes on, the dressings may be changed from the precipitate digestive before prescribed, to pledgets spread with Locatellus's balsam, or the following compound.

TAKE white diachylon two ounces, Locatellus's balsam one ounce, and melt them over the fire in two ounces of olive oil. Take off, and when nearly cool, stir in an ounce of balsam of capivi, a little at a time, till it is all incorporated.

These sinuses, or cavities, frequently degenerate into *fistulae*, that is grow pipey, having the inside thickened, and lined as it were, with a horny callous substance. In order to their cure, they must be laid open, and the hard substance all cut away; where this is impracticable, scarify them well, and trust to the precipitate medicine made strong, rubbing now and then with caustic, butter of antimony, or equal parts of quicksilver and aquafortis.

When a rotten or foul bone is an attendant on an ulcer, the flesh is generally loose and flabby; the discharge oily, thin, and stinking; and the bone discovered to be carious, by its feeling rough to the probe passed through the flesh for that purpose. In order to a cure the bone must be laid bare, that the rotten part of it be removed; for which purpose, destroy the loose flesh, and dress with dry lint; or the dossils may be pressed out of tincture of myrrh or euphorbium. The throwing off the scale is generally a work of nature, which is effected in more or less time, and in proportion to the depth the bone is affected; though burning the bone is thought by some to hasten its separation.

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Where the cure does not properly succeed, mercurial physic should be given, and repeated at proper intervals: and to correct and mend the blood and juices, the antimonial and alterative powders, with a decoction of guaiacum and lime-water, are proper for that purpose.

SECT. XXIX. *Of a Bone-Spavin.*

WITHOUT entering at all into the cause of this disorder, which is a bony excrescence, or hard swelling, growing on the inside of the hock of a horse's leg, we shall content ourselves with describing the different kinds thereof by their symptoms, and then enter on their cure.

A spavin that begins on the lower part of the hock, is not so dangerous as that which puts out higher, between the two round processes of the leg-bone; and a spavin near the edge is not so bad as that which is more inward toward the middle, as it does not so much affect the bending of the hock.

A spavin, that comes by a kick or blow, is at first no true spavin, but a bruise on the bone or membrane which covers it, therefore not of that consequence as when it proceeds from a natural cause: and those that put out on colts and young horses, are not so bad as those that happen to horses in their full strength and maturity; but in very old horses they are generally incurable.

The usual method of treating this disorder is by blisters and firing; without any regard to the situation, or cause whence it proceeds. Thus, if a fullness on the fore-part of the hock comes upon hard riding, or any other violence which threatens a spavin; in that case, such coolers and repellers are proper, as are recommended in strains and bruises. Those happening to colts and young horses are generally superficial, and require only the milder applications; for it is better to wear them down by degrees, than to remove them at once by severe means.

Various are the prescriptions for the blistering ointment; but the following, on proper experience, stands well recommended by Mr Gibson.

TAKE nerve and marshmallow ointment, of each two ounces; quicksilver, one ounce, thoroughly broke with an ounce of Venice turpentine; Spanish flies powdered, a dram and a half: sublimate, one dram; oil of origanum, two drams.

The hair is to be cut as close as possible, and then the ointment applied pretty thick over the part; this should be done in the morning, and the horse kept tied up all day without any litter till night; when he may be untied, in order to lie down; and a pitch or any sticking plaster may be laid over it, and bound on with a broad tape or bandage to keep all close.

After the blister has done running, and the scabs begin to dry and peel off, it may be applied a second time, in the same manner as before; this second application generally taking greater effect than the first, and in colts and young horses makes a perfect cure.

When the spavin has been of long standing, it will require to be renewed, perhaps five or six times: but after the second application, a greater distance of time must be allowed, otherwise it might leave a scar, or cause a baldness; to prevent which, once a fortnight or three weeks is often enough; and it may in this

manner be continued six or seven times, without the least blemish, and will generally be attended with Curb and Ring-bone.

But the spavins that put out on older or full-aged horses are apt to be more obstinate, as being seated more inward; and when they run among the sinuities of the joint, they are for the most part incurable, as they then lie out of the reach of applications, and are arrived to a degree of impenetrable hardness.

The usual method in these cases is to fire directly, or to use the strongest kind of caustic blisters; and sometimes to fire and lay the blister immediately over the part: but this way seldom succeeds farther than putting a stop to the growth of the spavin, and is apt to leave both a blemish and stiffness behind; besides the great risk run (by applications of these fiery and caustic medicines to the nervous and tendinous parts about the joints) of exciting violent pain and anguish, and destroying the limb.

The best and safest way, therefore, is to make trial of the blistering ointment above, and to continue it according to the directions there laid down, for some months, if found necessary; the horses in the intervals working moderately: the hardness will thus be dissolved by degrees, and wear away insensibly.

Where the spavin lies deep, and runs so far into the hollow of the joint that no application can reach it, neither firing nor medicines can avail, for the reasons abovementioned; though bold ignorant fellows have sometimes succeeded in cases of this sort (by men of judgment deemed incurable) by the application of caustic ointments with sublimate, which act very forcibly, enter deep, and make a large discharge, and by that means destroy a great part of the substance, and dissolve away the remainder: though, whoever is at all acquainted with the nature of these medicines, must know how dangerous in general their operation is on these occasions; and that a proper prepared cautery, made like a steam, under the direction of a skilful hand, may be applied with less danger of injuring either tendons or ligaments. After the substance of the swelling has been properly penetrated by the instrument, it must be kept running by the precipitate medicine, or mild blistering ointment. Where the spavin lies not deep in the joint, and the blistering method will not succeed, the swelling may be safely fired with a thin iron forced pretty deep into the substance, and then should be dressed as is above directed.

SECT. XXX. *Of a Curb and Ring-bone.*

1. As a spavin rises among the bones on the fore-part of the hocks so a curb takes its origin from the junctures of the same bones, and rises on the hind-part, forming a pretty large tumor over the back part of the hind-leg, attended with stiffness, and sometimes with pain and lameness.

A curb proceeds from the same causes that produce spavins; viz. hard ridings, strains, blows, or kicks. The cure at first is generally easy enough effected by blistering, repeated two or three times, or oftener. If it does not submit to this treatment, but grows excessively hard, the quickest and surest way is to fire with a thin iron, making a line down the middle from top to bottom, and drawing several lines in a penniform manner pretty deep; and then to apply a mild blistering

Splents. ing plaster or ointment over it.—This method will entirely remove it.

There is another swelling taken notice of on the outside of the hock, which is called a *jarden*. This commonly proceeds from blows and kicks of other horses; but frequently happens to maneged horses, by setting them on their haunches: it is seldom attended with much lameness, unless it has been neglected, or some little process of the bone be broke. It should first be treated with the coolers and repellers in sect. xxxii. art. 2: but if any swelling continues hard and insensible, the best way is to blister or fire; but the mild blisters alone generally succeed.

2. The *ring-bone* is a hard swelling on the lower part of the pastern, which generally reaches half way round the fore-part thereof, and from its resemblance to a ring has its denomination. It often arises from strains, &c.; and, when behind from putting young horses too early upon their haunches; for in that attitude a horse throws his whole weight as much, if not more, upon his pasterns, than on his hocks.

When it appears distinctly round the pastern, and does not run downwards towards the coronet, so as to affect the coffin-joint, it is easily cured: but if it takes its origin from some strain or defect in the joint originally, or if a callosity is found under the round ligament that covers that joint, the cure is generally dubious, and sometimes impracticable; as it is apt to turn to a quittor, and in the end to form an ulcer upon the hoof.

The ring-bones that appear on colts and young horses, will often insensibly wear off themselves, without the help of any application; but when the substance remains, there needs no other remedy besides blistering, unless when by long continuance it is grown to an obstinate hardness, and then it may require both blistering and firing.

To fire a ring-bone successfully, let the operation be performed with a thinner instrument than the common one, and let the lines or razes be made not above a quarter of an inch distant, crossing them obliquely, somewhat like a chain: apply a mild blister over all, and, when quite dried up, the rupture-plaster; and then turn the horse to grass for some time.

SECT. XXXI. Of Splents.

THESE are hard excrescences that grow on the shank-bone, and are of various shapes and sizes. Some horses are more subject to splents than others; but young horses are most liable to these infirmities, which often wear off and disappear of themselves. Few horses put out splents after they are seven or eight years old, unless they meet with blows or accidents.

A splent that arises in the middle of the shank-bone is nowise dangerous; but those that arise on the back part of this bone, when they grow large and press against the back sinew, always cause lameness or stiffness, by rubbing against it: the others, except they are situated near the joints, seldom occasion lameness.

As to the cure of splents, the best way is not to meddle with them unless they are so large as to disfigure a horse, or are so situated as to endanger his going lame.

Splents in their infancy, and on their first appear-

ance, should be well bathed with vinegar, or old verjuice; which, by strengthening the fibres, often put a stop to their growth; for the membrane covering the bone, and not the bone itself, is here thickened; and in some constitutions purging, and afterwards diuretic drinks, will be a great means to remove the humidity and moisture about the limbs, which is what often gives rise to such excrescences.

Various are the remedies prescribed for this disorder: the usual way is to rub the splent with a round stick or the handle of a hammer till it is almost raw, and then touch it with oil of origanum. Others lay on a pitch-plaster, with a little sublimate or arsenic, to destroy the substance; some use oil of vitriol; some tincture of cantharides: all which methods have at times succeeded; only they are apt to leave a scar, with the loss of hair. Those applications that are of a more caustic nature often do more hurt than good, especially when the splent is grown very hard, as they produce a rottenness, which keeps running several months before the ulcer can be healed, and then leaves an ugly scar.

According to Mr Taplin, the only expectation of cure "without anxiety and difficulty, is to be careful in observing such appearances, in their earliest state; and then seeing that frequent friction is used for a considerable time, twice every day, with the utmost force of the operator's hands, letting the part be well moistened, after each time of rubbing, with a proportion of the following liniment, leaving a pledget of tow wet with the same, bound on pretty firm with two yards of wide tape as a roller:

"TAKE camphorated spirits of wine, and spirits of turpentine of each four ounces (a quarter of a pint), Mix together.

"Or, OIL of origanum and spirits of turpentine, each half an ounce; camphorated spirits of wine, two ounces.—Mix.

"When this plan has been persevered in for ten days or a fortnight, you will then be able to judge whether any perceptible advantage has been obtained from the force of these powerful repellents: if not, procure two ounces of the strongest mercurial ointment, and let the size of a hazel-nut be well rubbed in upon the part affected, every night and morning, till the whole is consumed, using the roller each night, and taking it off in the morning. If this does not succeed, the best and most speedy method will be the immediate extirpation, by making a longitudinal incision ('without bruising, hammering, &c.') through the integuments, dissecting and extracting the substance, completing the cure by taking up a couple of stitches, and treating it as a superficial wound; for which directions will be found under that head."

SECT. XXXII. Of the Poll-evil; Fissula, and Bruises on the Withers; Warbles on the Back, and Sit-fasts.

1. THE *poll-evil* is an abscess near the poll of a horse, formed in the sinuses between the poll-bone and the upper vertebrae of the neck.

If it proceeds from blows, bruises, or any external violence, at first bathe the swelling often with hot vinegar; and if the hair be matted off with an oozing through

Poll evil,
Fistula, &c.

Poll evil, Fistula, &c. through the skin, make use of two parts of vinegar and one of spirit of wine; but if there be an itching, with heat and inflammation, the safest way is to bleed, and apply poultices with bread, milk, and elder flowers: this method, with the assistance of physic, will frequently disperse the swelling and prevent this evil.

But when the tumour is critical, and has all the signs of matter, the best method then is to forward it by applying the ripening poultices already taken notice of, till it comes to maturity, and bursts of itself: or if opened with a knife, great care should be taken to avoid the tendinous ligament that runs along the neck under the mane; when matter is on both sides, the opening must be made on each side, and the ligament remain undivided.

If the matter flows in great quantities, resembles melted glue, and is of an oily consistence, it will require a second incision, especially if any cavities are discovered by the finger or probe; these should be opened by the knife, the orifices made depending, and the wound dressed with the common digestive of turpentine, honey, and the tincture of myrrh, and, after digestion, with the precipitate ointment: or wash with the following made hot, and fill up the cavity with tow soaked into it:

VINEGAR or spirit of wine half a pint, white vitriol dissolved in spring-water half an ounce, tincture of myrrh four ounces.

This may be made sharper by adding more vitriol; but if the flesh is very luxuriant, it should first be pared down with a knife before the application. With this wash alone Mr Gibson has cured this disorder without any other formality of dressing, washing with it twice a-day, and laying over the part a quantity of tow soaked in vinegar and the white of eggs beat together.

But the most compendious method of cure, is that by *scalding*, as the farriers term it; and which used to be prosecuted when the sore was foul, of a bad disposition, and attended with a profusion of matter. But the cruelty, absurdity, and inutility of the practice have become so apparent, that it seems now to be almost universally exploded; so that it would be superfluous to give any description of the operation.

2. *Bruises* on the *withers* frequently imposthume, and for want of care turn fistulous. They arise often from pinches of the saddle, and should be treated with repellers: for this purpose bathe the tumor well with hot vinegar three or four times a-day; if that does not succeed alone, an ounce of oil of vitriol may be put to a quart of vinegar, or half an ounce of white vitriol dissolved in a little water, and added to the same quantity. These are generally held as very effectual repellers for this purpose in horses, and will frequently prevent imposthuration: when the swelling is attended with heat, smarting, and little hot watery pimples, the following mixture will then be more proper to bathe with.

TAKE two ounces of crude sal ammoniac, boiled in a quart of lime-water; where that cannot be had, a handful of pearl or wood ashes may be boiled in common water: pour off the decoction when settled, and mix with it half a pint of spirit of wine: anoint the part afterwards with linseed oil, or elder ointment, to soften and smooth the skin.

But when the swellings are critical, the consequence

of the fever settled on this part, you must avoid the repelling method, and assist in bringing the swelling to matter, by means of suppurating poultices: experienced farriers advise, never to open those tumors till they break of themselves: for if they are opened before they are ripe, the whole sore will be spongy, and discharge a bloody ichor, which soon degenerates into a sordid ulcer. But take care to enlarge the openings, and pare away the lips, that your dressings may be applied easily; and avoid the ligament which runs along the neck to the withers: if a gathering forms on the opposite side, open it in the same manner; but take care they incline downwards, for the sake of depending orifices, and letting the matter flow off easily. For the method of dressing, we must refer to the former part of this Section; and if the bones should be found foul, they must be dressed with tincture of myrrh till they scale off. If the fungus is very troublesome, and the discharge oily, yellow, and viscid, pledgets soaked in the following, made hot, have been found very effectual, bathing the swelling round with spirit of wine and vinegar:

TAKE half an ounce of blue vitriol dissolved in a pint of water; oil of turpentine, and rectified spirit of wine, of each four ounces; white-wine vinegar, six ounces; oil of vitriol and *Ægyptiacum*, of each two ounces.

When the cavities are truly fistulous, the callosities must be cut out, where it can be done, with a knife; and the remainder destroyed by corrosives.

3. *Warbles* are small hard tumors under the saddle-part of the horse's back, occasioned by the heat of the saddle in travelling, or its uneasy situation. As soon as the saddle is taken off after a severe chase or hard journey, a good groom or hostler will be very minute in his examinations to discover whether any injury has been sustained in this part or any other. He will instantly perceive, by the horse's wincing, whether there is any defect from which a warble may speedily ensue; if, so, upon the first appearance, or earliest discovery, bathe three or four times a-day with the following repellent:

Extract of Saturn half an ounce, camphorated spirit of wine two ounces, soft water a quarter of a pint; the extract and spirit being well-mixed by shaking, before adding the water.

4. A *sit-fast* proceeds generally from a warble, and is the horse's hide turned horny or callous. In some little time the hair comes off, and it bears the appearance of a foreign solid substance, fixed in the centre of what seems to be a superficial wound. For this simple and very trifling complaint there is but one certain and expeditious cure, namely, *extirpation*; which may be performed with a common penknife. But the most ready and least painful method of taking it off is by just raising either edge till it can be taken hold of with a pair of common pincers; when, by leaning them to any side, you have an immediate fulcrum, or lever, and separate it instantaneously without pain or inconvenience. After the extirpation, it may be treated as a simple superficial laceration, and may in general be healed by a frequent application of Friar's balsam, tincture of myrrh, or even with a little common brandy. Due care, however, should always be taken to guard the cicatrix in its infancy, and prevent the buckle

Poll-evil, buckle of the girth from coming into direct contact with the injured part, not only till the surface is sufficiently hardened to render a repetition unlikely, but upon all future occasions.

† *Treatise on the Prevention of the Diseases of Horses,* p. 245.

SOME parts of the above treatment of tumors, however, has been condemned, and a more simple method by means of setons recommended, by that judicious practitioner Mr Clark of Edinburgh. "The common method (says he†) of treating those large tumors which are seated on the upper part of the neck, immediately behind the ears, generally known by the name of the *poll-evil*, and those which are seated on the withers or upper parts of the shoulders, is exceedingly improper. They are either allowed to break of themselves, or are opened the whole length of the tumor on the upper part. In this situation, especially in the *poll-evil*, when the head is always kept in an erect position, the matter contained in the tumor cannot be discharged from it, but is retained in the bottom of the wound, and exposed to the external air, &c.: it soon acquires a most ichorous corroding quality, and produces one of the largest and the most sordid fistulous ulcers that horses are infested with: a great quantity of fungous or proud flesh is soon produced; this requires to be repeatedly extirpated with the knife, the loss of which cannot be again supplied; hence the horse is greatly disfigured, the cure becomes both tedious and uncertain, and is seldom radical. In some cases, I have known the vertebrae of the neck affected by the sharpness of the confined matter, forming lodgments there, and, after great trouble and expence, the horses were put to death.

"All these kinds of tumors, &c. are easily and speedily discussed by the use of setons, without any loss of substance, or disfiguring of the parts, and cured with the greatest certainty when the operation is properly performed. Of a number of cases, in my practice, where this operation has succeeded with great expedition in curing these tumors, I shall only mention the following.

"About six years ago, an Arabian horse, belonging to a gentleman in this place, had a large tumour seated a little on one side of the withers, or upper part of the shoulder; it was forwarded by applying emollient poultices; and as soon as the matter was perceived to fluctuate in the tumor, a large seton needle, armed with a cord at the other end, was introduced at the upper part of the swelling, and brought out at the under or lowermost part of it; the matter was discharged at the lower orifice in a very short time, the tumor was by that means soon discussed, and, in a few weeks, it was entirely healed up, without any scar or blemish remaining, farther than a little baldness about the lower orifice, occasioned by the sharpness of the matter, which likewise soon disappeared, and not the least trace of the disorder remained.

"The other case happened about seven years ago: a coach-horse (belonging to a nobleman in the neighbourhood) had a large tumor a little behind the ears, on the neck, which I have formerly observed is called the *poll-evil*; the tumor extended to both sides of the neck, and was divided in the middle by the mane; the tumor had been opened on one side, in a very superficial manner, by a farrier in the country, before the matter in it was sufficiently digested; after applying

a few emollient poultices, in order to ripen it, a strong seton needle, was introduced at the upper part of it, almost close to the mane, and after passing it through the bottom of the tumor, which was very deep, the needle was brought out through the sound muscular parts below the tumor, in order to procure a sloping or depending orifice for the matter to run freely off. The same operation was likewise performed on the opposite side, beginning near the mane, and finished in the same manner. In a few weeks the cure was completed. The horse ran for several years in the same nobleman's carriage, without the smallest vestige of his former disorder.

"From this method of treating these tumors, together with the use of alterative medicines, &c. which in cases of this nature ought never to be omitted, they were entirely discussed, and the perforations made by the needle soon healed up, without the least deformity of the parts. I have therefore given the history of these cases, to show with what facility and expedition such tumors may be carried off by the use of setons, in preference to the common methods used, and even recommended by different authors; such as, after opening these tumors by deep incisions, and pouring into them the most corrosive mixtures, made scalding hot, together with a long tedious course of hot irritating applications, by which the poor animals are kept in the utmost torture for a considerable time, and in the end are so disfigured by the loss of substance, occasioned by the cutting away so much of the flesh from the parts, that such horses are generally rendered unfit for any thing but the meanest drudgery.

"Deep-seated abscesses are cured in the same manner by the use of setons; after tracing the sinuses or cavities of the abscess with a long slender blunt lead probe (which yields easily without forcing its way through the cellular membrane, or taking a direction between the interstices of the muscles), the needle, armed with a cord, should follow the direction of the *sinews* or *pipes*, as they are commonly called, to the most depending part; and in case there should be two or more sinuses, which sometimes happens, each of them should be treated in the same manner, in order to obtain a depending orifice for a free discharge of the matter, and which being once procured, seldom fails of completing a cure."

SECT. XXXIII. *Of Wind-galls Blood and Bog Spavins.*

1. A WIND-GALL is a flatulent swelling, which yields to the pressure of the finger, and recovers its shape on the removal thereof; the tumor is visible to the eye, and often seated on both sides of the back sinew, above the fetlocks, on the fore-legs, but most frequently on the hind-legs; though they are met with in various parts of the body, wherever membranes can be so separated, that a quantity of air and serosities may be included within their duplicatures.

When they appear near the joints and tendons, they are generally caused by strains or bruises on the sinews, or the sheath that covers them; which, by being over-stretched, have some of their fibres ruptured; whence probably may issue out that fluid which is commonly found with the included air: though, where these swellings,

Wind-galls
Blood and
Bog-Spa-
vins.

ings show themselves in the interstices of large muscles, which appear blown up like bladders, air alone is the chief fluid; and these may safely be opened, and treated as a common wound.

On the first appearance of wind-galls, their cure should be attempted by restringents and bandage: for which purpose, let the swelling be bathed twice a-day with vinegar, or verjuice alone; or let the part be fomented with a decoction of oak-bark, pomegranate, and alum boiled in verjuice, binding over it, with a roller, a woollen cloth soaked in the same. Some, for this purpose, use red-wine lees, others carriers shavings, wetted with the same, or vinegar, bracing the part up with a firm bandage.

If this method, after a proper trial, should not be found to succeed, authors have advised the swelling to be pierced with an awl, or opened with a knife: but mild blistering has in general the preference given to these methods; the included fluids being thereby drawn off, the impacted air dispersed, and the tumor gradually diminished.

2. A *blood-spavin* is a swelling and dilatation of the vein that runs along the inside of the hock, forming a little soft swelling in the hollow part, and is often attended with a weakness and lameness of the hock.

The cure should be first attempted with the restringents and bandage above recommended, which will contribute greatly to strengthen all weaknesses of the joints, and frequently will remove this disorder if early applied; but if by these means the vein is not reduced to its usual dimensions, the skin should be opened, and the vein tied with a crooked needle and wax-thread passed underneath it, both above and below the swelling, and the turgid part suffered to digest away with the ligatures: for this purpose, the wound may be daily dressed with turpentine, honey, and spirit of wine, incorporated together.

3. A *bog-spavin* is an encysted tumor on the inside of the hough; or, according to Dr Bracken, a collection of brownish gelatinous matter, contained in a bag or cyst, which he thinks to be the lubricating matter of the joint altered, the common membrane that incloses it forming the cyst. This case he has taken the pains to illustrate in a young colt of his own, where he says, When the spavin was pressed hard on the inside the hough, there was a small tumor on the outside, which convinced him the fluid was within-side the joint: he accordingly cut into it; discharged a large quantity of this gelatinous matter; dressed the sore with doffils dipped in oil of turpentine; putting into it, once in three or four days, a powder made of calcined vitriol, alum, and bole: by this method of dressing, the bag sloughed off, and came away, and the cure was successfully completed without any visible scar.

This disorder, according to the above description, will scarcely submit to any other method, except firing, when the cyst ought to be penetrated to make it effectual; but in all obstinate cases that have resisted the above methods, both the cure of this and of the swellings called *wind-galls* should be attempted in this manner. If, through the pain attending the operation or dressings, the joint should swell and inflame, foment it twice a-day, and apply a poultice over the dressings till it is reduced.

SECT. XXXIV. Of Mallenders and Sallenders.

Mallenders
and Sallen-
ders.

MALLENDERS are cracks in the bend of the horse's knee, that discharge a sharp indigested matter; they are often the occasion of lameness, stiffness, and the horse's tumbling.

Sallenders are the same distemper, situated on the bending of the hough, and occasion a lameness behind.

They are both cured by washing the parts with a lather of soap warmed, or old chamber-lye; and then applying over the cracks a strong mercurial ointment spread on tow, with which they should be dressed night and morning, till all the scabs fall off; if this should not succeed, anoint them night and morning with a little of the following, and apply the above ointment over it.

TAKE hog's lard two ounces, sublimate mercury two drams.

Or, TAKE hog's lard two ounces, oil of vitriol two drams.

Take the next from Gibson, which is to be depended on:

ÆTHIOP's mineral half an ounce, white vitriol one dram, soft green soap six ounces.

Anoint with this often; but first clip away the hair, and clear the scabs. On their drying up, it may be proper to give a gentle purge or two; or the nitre-balls may be taken advantageously for a fortnight or three weeks.

SECT. XXXV. Of Lampas, Barbs, and Wolves-Teeth.

1. THE *lampas* is an excrescence in the roof of the horse's mouth, which is sometimes so luxuriant, that it grows above the teeth, and hinders his feeding. The cure is in lightly cauterising the flesh with a hot iron, taking care that it does not penetrate too deep so as to scale off the thin bone that lies under the upper bars; the part may be anointed with burnt alum and honey, which is proper for most sores in the mouth.

This operation is by some thought to be entirely unnecessary; it being a general observation with them, that all young horses have their mouths more or less full of what are called *lampas*; and that sometimes they rise higher than the fore-teeth: but they further observe, in proportion as a horse grows older, the roof flattens of itself, and the teeth then appear to rise. We are obliged to the ingenious M. L. Fosse for this remark, and hope it will be the means of abolishing this cruel and unnecessary operation.

2. *Barbs* are small excrescences under the tongue, which may be discovered by drawing it aside, and are cured by cutting close off, and washing with brandy or salt and water.

3. A horse is said to have *wolves-teeth*, when the teeth grow in such a manner, that their points prick or wound either the tongue or gums in eating. Old horses are most liable to this infirmity, and whose upper overshoot the under teeth in a great degree.

To remedy this evil, you may either chop off the superfluous parts of the teeth with a chissel and mallet, or file them down, which is the better way, till you have sufficiently wasted them.

SECT.

Grease.

SECT. XXXVI. *Of the Grease.*

IN order to treat this disorder with some propriety, we shall consider it as arising from two different causes; a fault or relaxation in the vessels, or a bad disposition in the blood and juices. We must here observe, that the blood and juices (or humours, for there are always some in the best state of blood) are brought to the extreme parts by the arteries, and returned by the veins; in which latter, the blood is to rise in perpendicular columns, to return the circulating fluids from the extremities: hence swellings in the legs of horses may easily be accounted for, from a partial stagnation of the blood and juices in the finer vessels, where the circulation is most languid; and especially when there is want of due exercise, and a proper muscular compression on the vessels, to push forward the returning blood, and propel the inert and half-stagnating fluids through their vessels; in short, the blood in such cases cannot so readily ascend as descend, or a greater quantity is brought by the arteries than can be returned by the veins.

The grease then, considered in this light, must be treated as a local complaint, where the parts affected are alone concerned, the blood and juices being yet untainted, and in good condition; or as a disorder where they are both complicated: but when it is an attendant on some other distemper, as the farcy, yellows, dropfy, &c. such diseases must first be cured before the grease can be removed. In the former case, moderate exercise, proper dressing, cleanliness, and external application, will answer the purpose: in the latter, internals must be called in to our assistance, with proper evacuations.

When a horse's heels are first observed to swell in the stable, and subside or go down on exercise; let care be taken to wash them very clean every time he comes in, with soap-suds, chamber-lye, or vinegar and water; which, with proper rubbing, will frequently prevent or remove this complaint: or let them be well bathed twice a-day with old verjuice, or the following mixture, which will brace up the relaxed vessels; and if rags dipped in the same are rolled on, with a proper bandage, for a few days, it is most likely the swellings will be removed by this method only, as the bandage will support the vessels till they have recovered their tone. To answer this end also, a laced stocking made of strong canvas or coarse cloth, neatly fitted to the part, would be found extremely serviceable, and might easily be contrived by an ingenious mechanic.

TAKE rectified spirit of wine four ounces; dissolve in it half an ounce of camphor; to which add wine-vinegar or old verjuice six ounces; white vitriol dissolved in a gill of water one ounce; mix together, and shake the phial when used.

But if cracks or scratches are observed, which ooze and run, let the hair be clipped away, as well to prevent a lodgment (which becomes stinking and offensive by its stay), as to give room for washing out dirt or gravel, which if suffered to remain there, would greatly aggravate the disorder.

When this is the case, or the heels are full of hard scabs, it is necessary to begin the cure with poultices, made either of boiled turnips and lard, with a handful

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of linseed powdered; or oat-meal and rye flour, with a little common turpentine and hog's lard, boiled up with strong-beer grounds or red-wine lees. The digestive ointment being applied to the sores for two or three days, with either of these poultices over it, will, by softening them, promote a discharge, unload the vessels, and take down the swelling; when may be dried up with the following:

TAKE white vitriol and burnt alum, of each two ounces; Ægyptiacum one ounce; lime-water a quart or three pints: wash the sores with a sponge dipped in this three times a-day; and apply the common white ointment spread on tow, to an ounce of which may be added two drams of sugar of lead.

This method is generally very successful when the distemper is only local, and requires no internal medicines; but if the horse be full and gross, his legs greatly gorged, so that the hair stares up, and is what some term pen-feathered, and has a large stinking discharge from deep foul sores, you may expect to meet with great trouble, as these disorders are very obstinate to remove, being often occasioned by a poor dropical state of blood, or a general bad disposition in the blood and juices.

The cure in this case, if the horse is full and fleshy, must be begun by bleeding, rowels, and repeated purging; after which, diuretic medicines are frequently given with success. Thus,

TAKE four ounces of yellow rosin, one of sal prunellæ; grind them together with an oiled pestle; add a dram of oil of amber; and give a quart of forge-water every morning, fasting two hours before and after taking, and ride moderately.

As this drink is found very disagreeable to some horses, we would recommend the nitre-balls in its stead, given to the quantity of two ounces a-day for a month or six weeks, mixed up with honey or in his feeds. Take the following also for that purpose; or the diuretic balls directed under *Disorders of the Eyes*.

YELLOW rosin four ounces; salt of tartar, and sal prunellæ, of each two ounces; Venice soap half a pound; oil of juniper, half an ounce; make into balls of two ounce weight, and give one every morning.

The legs in this case should be bathed or fomented, in order to breathe out the stagnant juices, or to thin them, so that they may be able to circulate freely in the common current. For this purpose, foment twice a-day with the discutient fomentation (p. 143. col 2.), in which a handful or two of wood-ashes has been boiled; apply then the above poultices, or the following, till the swelling has subsided, when the sores may be dressed with the green ointment till they are properly digested, and then dried up with the water and ointment above recommended.

TAKE honey one pound; turpentine six ounces; incorporate with a spoon; and add of the meal of fenugreek and linseed each four ounces; boil in three quarts of red-wine lees to the consistence of a poultice; to which add, when taken from the fire, two ounces of camphor in powder; spread it on thick cloths, and apply warm to the legs, securing it on with a strong roller.

If the sores are very foul, dress them with two parts
U of

Scratches,
Crown-
scabs, &c.

of the wound-ointment, and one of *Ægyptiacum*; and apply the following, spread on thick cloths, and rolled on.

TAKE of black soap, one pound; honey half a pound; burnt alum four ounces; verdigrease powdered two ounces; wheat flour a sufficient quantity.

If the diuretic balls should not succeed, they must be changed for the antimonial and mercurial alteratives, already mentioned; but turning a horse out in a field, where he has a hovel or shed to run at pleasure, would greatly contribute to quicken the cure, and indeed would in general effect it alone; but if this cannot be complied with, let him be turned out in the day-time.

If the horse is not turned out, a large and convenient stall is absolutely necessary, with good dressing and care.

The last thing we shall recommend, is a method to oblige a horse to lie down in the stable. This undoubtedly is of the utmost consequence, as it will not a little contribute to the removal and cure of this disorder; for by only changing the position of his legs, a freer circulation would be obtained, and the swelling taken down; whereas in general it is greatly aggravated by the obstinacy of the horse, who refuses to lie down at all (probably from the pain it gives him to bend his legs for that purpose), by which means the stiffness and swelling increases, till the over-gorged and distended vessels are obliged to give way; and by bursting, discharge the fluids, which should circulate through them.

SECT. XXXVII. Of Scratches, Crown-scabs, Rat-tails, and Capellets.

1. SCRATCHES in the heels have so much affinity with the grease, and are so often concomitants of that distemper, that the method of treating them may be selected chiefly from the preceding section; which at first should be by the linseed and turnip poultice, with a little common turpentine, to soften them and relax the vessels; the green ointment may then be applied for a few days to promote a discharge, when they may be dried up with the ointments and washes recommended in the above section. It is best afterwards to keep the heels supple, and softened with currier's dubbing, which is made of oil and tallow. This will keep the hide from cracking, and be as good a preservative as it is to leather; and, by using it often before exercise, will prevent the scratches, if care is taken to wash the heels with warm water when the horse comes in: When they prove obstinate, and the sores are deep, use the following; but if any cavities or hollow places are formed, they should first be laid open; for no foundation can be laid for healing till you can dress to the bottom.

TAKE Venice turpentine four ounces; quicksilver one ounce; incorporate well together by rubbing some time; and then add honey and sheeps suet of each two ounces.

Anoint with this once or twice a-day; and if the horse is full or fleshy, you must bleed and purge; and if the blood is in a bad state, the alteratives must be given to rectify it.

2. The crown scab is a humour that breaks out

round the coronet, which is very sharp and itching, and attended with a scurfiness: sharp waters prepared with vitriol are generally used for the cure; but the safest way is first to mix marshmallow and yellow basilicon, or the wound-ointment, equal parts, and to spread them on tow, and lay all round the coronet. A dose or two of physic may be very proper, with the diuretic medicines prescribed in the preceding page, and the alteratives above recommended, in rebellious cases. *Vide the Section on Alteratives.*

3. Rat-tails are excrescences which creep from the pastern to the middle of the shanks, and are so called from the resemblance they bear to the tail of a rat. Some are moist, others dry; the former may be treated with the drying ointment and washes, p. 153. col. 2. par. 1. the latter with the mercurial ointment prescribed in the Section of Strangles, p. 129. col. 2. If the hardness does not submit to the last medicine, it should be pared off with a knife, and dressed with turpentine, tar, and honey, to which verdigrease or white vitriol may occasionally be added; but before the use of the knife, you may apply this ointment.

TAKE black soap four ounces, quick lime two ounces, vinegar enough to make an ointment.

4. There are particular swellings which horses are subject to, of a wenny nature, which grow on the heel of the hock, and on the point of the elbow, and are called by the French and Italians *capellets*: they arise often from bruises and other accidents; and when this is the case, should be treated with vinegar and other repellers. But when they grow gradually on both heels or elbows, we may then suspect the blood and juices in fault, and that some of the vessels are broke and juices extravasated: in this case the suppuration should be promoted, by rubbing the part with marshmallow ointment; and when matter is formed, the skin should be opened with a lancet in some dependent part towards one side, to avoid a scar; the dressings may be turpentine, honey, and tincture of myrrh. The relaxed skin may be bathed with equal parts of spirit of wine and vinegar, to which an eighth part of the oil of vitriol may be added. The contents of these tumors are various; sometimes watery; at others suety, or like thick paste; which, if care be not taken to digest out properly with the cyst, will frequently collect again. Was it not for the disfigurement, the shortest method would be to extirpate them with a knife, which if artfully executed, and the skin properly preserved, would leave very little deformity.

SECT. XXXVIII. Of Ruptures, Anticor Diseases of the Mouth, and Colt-evil or Gonorrhœa.

1. IN regard to ruptures, though they are generally divided into particular classes, we shall only observe, that by violent efforts of the horse, or other accidents, the guts or caul may be forced between the muscles of the belly at the navel, and through the rings of the muscles into the scrotum or cod. The swellings are generally about the size of a man's fist, sometimes much larger, descending to the very hock: they are frequently soft, and yield to the pressure of the hand, when they will return into the cavity of the belly with a rumbling noise: and, in most, the vacuity may be felt through which they passed.

On their first appearance, endeavours should be made

Ruptures,
Anticor,
&c.

to return them by the hand ; but if the swelling should be hard and painful, in order to relieve the stricture, and relax the parts through which the gut or caul has passed, let a large quantity of blood be immediately taken away, and the part fomented twice or thrice a-day, applying over it a poultice made of oatmeal, oil, and vinegar, which should be continued till the swelling grows soft and easier, or the gut is returned. In the mean time, it would be proper to throw up emollient oily glysters twice a-day, and to let the horse's chief diet be boiled barley, scalded malt, or bran.

Should the swelling afterwards return, we apprehend the restraining applications, usually recommended on these occasions, will avail little without a suspensory bandage ; so that an ingenious mechanic in that art is chiefly to be relied on for any future assistance ; though it has been observed, that with moderate feeding, and gentle exercise, some horses have continued to be very useful under this complaint.

2. THE *anticor* is a disorder not very common among our horses, or those in northern climates ; but is particularly taken notice of by the French, Spanish, and Italian writers ; who describe it a malignant swelling in the breast, which extends sometimes to the very sheath under the belly ; it is attended with a fever, great depression and weakness, and a total loss of appetite.

The cure should be first attempted by large and repeated bleedings, to abate the inflammation ; emollient glysters should be injected twice or thrice a-day, with an ounce of sal prunella in each, and the cooling drink, in the Section on *Fevers*, should be given inwardly : the swelling should be bathed with the marshmallow ointment ; and a ripening poultice, with onions boiled in it should be applied over it. If by this method, continued four or five days, the inflammation in the throat and gullet is removed, our attention should more particularly turn to encourage the swelling at the breast, and bring it, if possible, to matter : to which end, continue the poultice, and give two ounces of Venice treacle dissolved in a pint of beer every night ; when the swelling is grown soft, it must be opened with the knife, and dressed with turpentine digestive, the danger now being over.

But should it be found impracticable to bring the swelling to matter, and it increases upwards, so as to endanger suffocation ; authors have advised to pierce the tumor with a hot pointed cautery in five or six places ; to dress with the above digestive ; and, in order to stimulate and promote a greater discharge, to add to it a small quantity of Spanish flies and euphorbium in powder ; fomenting at the same time, and bathing the circumjacent parts with ointment of marshmallows. M. Guerinere, as well as Soleysel, have advised opening the skin, when the tumor cannot be brought to matter, in order to introduce a piece of black hellebore-root steeped in vinegar, and to confine it there for 24 hours : this also is intended as a stimulant ; and is said to answer the intention, by occasioning sometimes a swelling as big as a man's head.

3. Besides the disorders of the mouth, which we have already animadverted on, there are frequently observed on the inside the lips and palate, little swellings or bladders called *giggs*. Slitting them open with a knife or lancet, and washing them afterwards with salt and vinegar, is in general their cure : but when

they degenerate into what are called *cankers*, which are known by little white specks, that spread and occasion irregular ulcers, the best method then is to touch them daily with a small flat cautery, moderately heated till the spreading is stopped, and to rub the sores three or four times a-day with *Ægyptiacum*, and tincture of myrrh sharpened with oil or spirit of vitriol ; when by this dressing the sloughs are separated, they may be washed frequently with a sponge dipped in copperas, or sublimate water, if they continue to spread ; or a tincture made by dissolving half a ounce of burnt alum, and two ounces of honey, in a pint of tincture of roses. Either of these will dry them up, and are very useful in most disorders of the mouth.

A relaxation and swelling of the palate sometimes happens to horses on catching cold. To remedy this disorder, blow pepper on the part, or anoint it with the same mixed up with honey. The tincture abovementioned may be used for this purpose, to which may be added half an ounce of spirit of sal ammoniac.

4. The *colt-evil* is supposed to arise from stoned colts having full liberty with mares, before they are able to cover them ; whence frequently ensues an excoriation or fretting on the glands and a swelling on the sheath. This last disorder frequently proceeds too from dirt or filth lodging there, and is often removed by washing the part clean with butter and beer : but when the yard itself is swelled, foment it twice a-day with marshmallows boiled in milk, to which may be added a little spirit of wine ; anoint the excoriation with the white ointment, or wash it with a sponge dipped in lime, to a pint of which may be added two drams of sugar of lead : the yard should be suspended up to the belly ; and if the swelling should increase with the inflammation, bleed, and give the cooling physic, anoint with ointment of alder, and apply the bread-and-milk poultice.

If a simple gonorrhœa or seminal gleet is observed to drip from the yard (which is often the case in high-fed young horses, where a relaxation of the glands and seminal vessels has been brought on by frequent emissions), let the horse be plunged every day into a river or pond ; give him two or three rhubarb purges, at proper distances ; and intermediately the following balls.

TAKE of balsam of copivi, or Venice turpentine, oil-banum, and mastich powdered, of each two drams ; bole armeniac, half an ounce : mix up into a ball with honey, and give it night and morning till the discharge lessens, and then every night till it goes off.

Balls prepared with rhubarb and turpentine may also be given for this purpose ; two drams of the former with half an ounce of the latter.

SECT. XXXIX. Preliminary Remarks on DISEASES of the FEET.

I. Of *Greasing, Oiling, and Stuffing Horses Hoofs*. The custom of keeping our finest horses constantly standing upon dry litter and hot dung in the stable, is exceedingly hurtful to the feet and legs, particularly the former, which are always found to agree best with coolness and moisture. Hence we find, that horses hoofs, whilst running in the fields, are always in bet-

Remarks on Diseases of the Feet. ter condition than those that are kept hot and dry in the stable, which, beside being liable to many diseases, are hard, brittle, shattered, and often broken.

With respect to greasy or oily applications, so often prescribed for the hoofs of horses in order to preserve them sound, tough, &c. Mr Clark * very justly con-

* Observations on the Shoeing of Horses, and on the Diseases of their Feet; from which judicious performance the following sections are extracted.

demns them as rather pernicious than salutary. When young horses (he observes) are first taken from the fields, their hoofs are cool, sound, and tough. These are found from experience to be good qualities. But horses are no sooner introduced into the stable, than their hoofs are greased or oiled two or three times a-week: and if they are kept much in the house standing upon hot dry litter, without being frequently led abroad, and without having an opportunity of getting their hoofs cooled and moistened in wet ground, their hoofs grow so brittle, dry, and hard, that pieces frequently break off, like chips from a hard stone; and, when driving the nails in shoeing, pieces will split off, even although the nails are made very fine and thin. Now, if these same horses with brittle shattered hoofs are turned out to graze in the fields, their hoofs in time will become, as they were originally, sound, tough, and good.

This change must undoubtedly be ascribed to the wet and moisture which the hoofs are exposed to in the fields, of which water is the principal ingredient; and it is a certain fact, of which we have daily proofs, that when all other means fail, horses are turned out to graze in order to recover their decayed brittle hoofs. It is known, that the hoofs of horses, are porous; and that insensible perspiration is carried on through these pores, in the same manner, and according to the same laws, as take place in other parts of the body. Now, every body knows, that greasy or oily medicines applied to the skin of the human body, prevent perspiration, which is frequently attended with the worst consequences. The same reasoning will hold with respect to the hoofs of horses; for greasy or oily applications close or shut up the pores of the hoof, by being absorbed or sucked into its inner substance. Hence the natural moisture which should nourish the hoof, is thereby prevented from arriving at its surface; which, on that account, becomes as it were dead, and consequently dry, brittle, and hard.

The original practice of greasing or oiling horses' hoofs, had probably taken its rise, from observing, that grease or oil softened dead substance, such as leather, &c. But this will by no means apply to the hoofs of horses, as there is a very great difference between the living and dead parts of animals; the former having juices, &c. necessary for their own nourishment and support, whilst the latter require such applications as will preserve them from decaying and rotting.

The dealers in horses about London, when they get a bad-footed horse in their hands, moisten his hoofs frequently in water; for which purpose they keep a puddle of water and dung at the watering place, that when the horse comes to water, his fore-feet may be sunk in the puddle, by which means they are cooled and moistened twice or thrice every day; so that, whilst they are making up his carcass for the market, his hoofs are likewise repaired, and sufficient to stand the test of a trial upon sale. But no sooner do horses with hoofs of this kind come into other hands, their hoofs at the same time being kept dry and greased, &c. than

they degenerate into their former state. Hence, the cause of so many complaints that horses turn soon lame after they come from dealers, when, in fact, it proceeds from greasy applications, and neglecting to cool or moisten the hoofs in water; for the careful groom, when airing his master's horses, rather than lead them into a puddle, will go about in order to keep their feet clean and dry.

Another practice equally pernicious, is the stuffing up horses' hoofs (as it is called) with hot resinous, and greasy mixtures, under the notion of cooling and softening them. Various are the prescriptions recommended for this purpose, many of which are of a quite opposite nature to the purpose intended.—There is likewise a great impropriety in stuffing up the hoofs with rotten dung and stale urine: this, it is true, is moisture; but of the very worst kind, on account of the salts contained in the urine, which of itself greatly contributes towards hardening and drying their hoofs, in place of softening them; besides the other bad effects which may arise to the frog, &c. from the rotteness of the dung. But, without commenting upon the various compositions or pompous prescriptions recommended in books, or those handed about as receipts for the softening and stuffing horses' hoofs, the author would recommend one which is more natural, and ought not to be despised for its simplicity, as it is only cooling and moistening the hoofs with water morning and evening: And, to those who are fond of stuffing, he would prescribe bran and water, or clay, &c. made into the consistency of a poultice; and, in particular cases, where horses stand much in the stable, and the hoofs are disposed to be very hard, dry, and brittle, a poultice of this kind, or any other emollient composition in which water is a principal ingredient, may be applied all round the hoof; or, in imitation of some dealers, to keep a puddle of water at the watering-place, which will answer equally well, if not better. From this manner of treatment, the hoofs will be preserved in their natural state, and a free and equal perspiration kept up, by which the nourishment natural to the hoof will have free access to its surface, as it is this only which causes that cohesion of the parts which constitutes a firm, sound, tough hoof.

II. *Of the natural Defects of the Feet.* It is very well known, that different climates and different soils greatly affect the feet of horses. Those that are bred in hot countries, standing mostly upon dry ground, have deep crusted hollow hoofs with small frogs; for, being but little exposed to wet or moisture, the fibres of the hoof contract more closely. And, even in Great-Britain, there is a considerable difference, according to the dryness or wetness of the soil upon which horses are bred. Those that are bred upon the mountainous parts of England and Wales, and in the northern parts of Scotland, have generally good sound tough hoofs; whilst those horses that are bred upon low marshy grounds (which are mostly of the big draught kind), have flat, large, soft hoofs; for being kept too moist, by always soaking in wet, the horny fibres of the hoof are too much relaxed.

Those hoofs which are either too large or too small, in proportion to the size of the body, and thickness of the bones of the legs, are generally, and not without foundation, looked upon as bad. Large broad hoofs, for

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Remarks for the most part, have thin flat soles; large, soft, spongy frogs: a strong crust, something hollow upon the upper and fore part, and full of wrinkles or rings, not unlike the rough outside of an oyster-shell. Hoofs of this shape are liable to that disease termed *foundered*; and to have high, round, or swelled soles, and low weak heels, &c.

Small hoofs are liable to the opposite extreme, especially those of that kind which generally go under the denomination of *asses' hoofs*, as they are deep crusted and narrow, the sole very hollow, the frog small, the heels high and strong, the crust upon the outside clear and shining; these are naturally disposed to a contraction of the whole hoof which is called *hoof-bound*; and likewise to corns, running thrushes, or frushes either of which render a horse lame.

Some hoofs are pretty well proportioned, and look well to the eye; but, at the same time, they are thin and weak crusted, and not able to stand much fatigue in travelling upon hard stoney grounds. On the other hand, very strong crusted hoofs are by no means the best, but are liable to cracks, &c. In such hoofs, the horny fibres appear very distinct, and run in a straight line from the coronet or top of the hoof to its basis, resembling the grain of some kinds of wood, particularly oak. Hence they are disposed to cracks or fissures, which cleave the hoof quite through, sometimes from the coronet down to the bottom of the hoof. In others, these cracks at first do not penetrate through the horn, but appear like a seam on the surface of the hoof, commonly named a *sand-crack*; which, from retaining the sand and gravel, at last works its way into the quick, and occasions lameness, &c. Another disadvantage attending very strong crusted hoofs is, that, when they stand long in a dry hot stable, they contract, and by their thickness and hardness bruise the internal parts of the foot. Hence the horse will be lame, though, at the same time, no visible defect will be seen about the hoof, excepting a great heat, pain, and tenderness in his feet; the true cause of which is seldom attended to or known; and hence the horse is said to be lame in some other part, perhaps the shoulders. Low thin heels are weak-crusted, and liable to lameness from injudicious shoeing. The opposite extreme, *viz.* very high heels, is equally bad; as these are subject to corns, and contraction of the hoof; and the deepness of the crust causes a numbness in the feet, and unsteadiness in the horse's going, which make him liable to trip and stumble.

Much has been said by authors, with respect to the different colours of horses' hoofs, ascribing different qualities, and temperaments to peculiar colours, such as hardness, dryness, brittleness, &c. But it is very well known to practitioners in shoeing horses, that there are good and bad hoofs of all colours; some being naturally weak and disposed to be brittle, whilst others are tough and strong. But a great deal depends upon the management of them in the stable, in keeping them properly moistened, in order to preserve a due medium between these opposite extremes. It likewise generally remarked by authors, as a sure sign of bad thin hoofs, that, when the shoe-nails are drove high up in the crust, it is, say they, an evidence that the crust is thin, and that there was not sufficient hold, without driving the nails high up. But this can be no true

criterion to judge by; for, if the nails can be driven high up in the crust with safety in a thin weak foot, the same may as certainly be done in a strong foot, with more ease and expedition, which indeed is frequently the case.

To form a right judgment of what may be called a *good hoof*, it must neither be too large nor too small in proportion to the size of the leg: at the same time, its shape must be regular, gradually enlarging from the coronet towards its basis; the crust smooth, even, and free from seams, cracks, or wrinkles; the sole strong, and a little hollow; the heels firm and open; the frog tough, sound, and dry.

SECT. XL. Wounds in the Feet.

WOUNDS in the feet happen frequently, but chiefly from want of proper care, and treating them injudiciously when they are first inflicted.

1. Wounds upon the coronet, or top of the hoof, when superficial, are easily cured, if not neglected or improperly treated. But the most simple wound, by bad management or neglect, may, especially if the horse should happen at the time to be in a bad habit of body, be attended with dangerous consequences: therefore, however trifling they may at first appear, they should be treated with attention.

When large deep wounds are inflicted upon the coronet, from which may be apprehended a great inflammation, and its consequences; to prevent these evils as much as possible, it will be necessary to have recourse to bleeding, and at the same time to give such internal remedies as are recommended in inflammatory cases; cooling salts, glysters, &c. together with a low soft diet, keeping the hoof moist and soft with emollient poultices applied around it, which may be made of turnip, mallows, or even bran and water.

Deep wounds upon the coronet are generally made by long sharp caulkers upon the heels of the shoes of the opposite foot, penetrating downwards between the coffin-bone and the hoof. In this case, as there is no depending orifice or passage for the matter contained in the wound to be discharged downwards, there is great danger of a fistula or sinuous ulcer being formed; to prevent which, an artificial drain or opening must be made through the hoof, first rasping or paring it very thin upon the outside where the perforation is to be made; then introduce a sharp-pointed instrument, a little bent, into the orifice of the wound, and, passing it to the bottom, force it outwards. This operation will be performed with less pain to the animal, if the instrument be concealed within a canula or hollow tube, till it reaches to the bottom of the wound; when the perforation is to be made by pushing it beyond the extremity of the canula; and, by applying a bandage pretty tight round the coronet, the sides or lips of the wound may be brought into contact and healed up, or a seton may be introduced, and continued till the inflammation, swelling, &c. are removed. If this operation be too long delayed, the matter confined in the wound forms a number of sinuses or fistulae, which frequently run in different directions under the hoof, and require a large portion of it to be cut away before they can be healed up, leaving an ugly blemish, and a weakness or tenderness on that part of the hoof, which never admits of a thorough cure. But,

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by treating it in the manner now mentioned, the annular ligament may be preserved entire, and a false quarter avoided: and, although there may remain an horizontal crack or fissure in the hoof where the perforation was made; yet, as the hoof grows downward, it will likewise go along with it, and wear out, without leaving a blemish or any other bad consequence.

When the capsular ligament of the coffin-joint is wounded or perforated by any instrument, so as to admit the external air into its cavity, the glands there situated inflame; and, in place of secreting a lubricating mild liquor, they discharge a sharp ichorous fluid, which destroys and corrodes the very cartilages or gristles upon the ends of the articulated bones, which at last grow together, and form what is termed an *an-ehylosis*, and of course lameness. There are many farriers who boast of their having cured wounds in the joints after they were affected with that symptom which they call a *joint-water*, that is, a discharge of the synovia or mucilaginous fluid contained within the cavity of the joint. But what they commonly call a *joint-water*, is only a yellow serum or lymph, which is frequently to be met with issuing in great abundance from wounds in the legs; and not the synovia or fluid contained within the cavity of the joint. Notwithstanding wounds of this kind happen frequently; yet, so little are the generality of practitioners acquainted with the nature of them and their consequences, that they make no distinction betwixt them and those of a more simple nature. Hence, therefore, they find themselves frequently mistaken in prognosticating the cure of a wound, to appearance of a very simple nature.

It is a certain fact, confirmed by experience, that when the capsular ligament of any joint is perforated or cut through, there is but little chance of a complete cure being effected, so as the horse may be useful for the saddle or carriage; although, in other respects, to those who are willing to be at the expence, he may, if a strong horse, be useful in some kinds of drudgery.

As to the mode of dressing wounds of this kind, all that art can do, is to prevent as much as possible, a violent inflammation or flux of humours to the affected limb, by bleeding, glysters, cooling salts, together with a low soft diet applying digestive poultices to the wound, and injecting now and then into the cavity of the joint tincture of myrrh.

2. Wounds upon the coronet towards the back part of the foot or heel, which are commonly called an *over-reach*, are occasioned by the toe of the hind-shoe on the same side cutting the fore-heel. Some horses are much addicted to this, owing entirely to their manner of going, viz. the hind-foot moving in the same line of direction with the fore-foot; in riding fast, the fore-foot not giving place in time, the hind-foot strikes against the fore-heel: hence some horses, in trotting, make a clattering noise with the hind-shoes striking against the heel of the fore ones; hence, likewise, many horses are thrown down by the same cause.

Although an over-reach is a wound of the complicated kind, being at the same time a contusion or bruise together with a wound: yet they are nowise dangerous, and are easily cured by treating them in the man-

ner hereafter mentioned; for, in two or three days, when the wound comes to suppurate properly, the bruised or dead parts fall off, and only leave a larger surface of a wound than was at first apprehended.

With respect to the dressing proper for recent wounds, farriers are too much prejudiced in favour of certain balsams, ointments, and tinctures; and too sanguine in the belief of their supposed specific virtues, the healing qualities of which they flatter themselves are irresistible. But the truth is, all that art can do in the healing of wounds, is to remove every impediment which may obstruct the uniting of the divided parts, and to forward the formation of laudable pus or matter; that being once effected, the rest is performed by nature, which is self-sufficient. All the balsams and remedies which are said to generate new flesh, in fact only assist nature by excluding the external air, keeping the wounded parts warm and confining the secreted humours, which by remaining there a due time, are converted into laudable matter, which is the balsam of nature's preparing. I therefore, the most approved and rational method of treating recent wounds is, to endeavour to bring them to a suppuration or discharge of laudable matter; for which purpose, poultices are most eligible, as they may be easily made more or less of a digestive quality, by melting and mixing any proper digestive ointment with the poultice whilst warm.

Digestive ointment. TAKE common turpentine and hog's lard, of each equal parts, melted together.

This ointment may be made stronger or weaker, by diminishing the one ingredient and increasing the other; and is very proper to be mixed with poultices, in order to keep them soft and pliable.

Digestive Poultice. TAKE oat-meal or coarse wheat-flour; digestive ointment, two ounces; beer-grounds, a sufficient quantity: boil the whole to the consistence of a poultice. The quantity of the ointment may be increased or diminished in proportion to the size of the poultice.

The experience the author has had of the good effects of poultices of this kind in recent wounds, makes him recommend them as preferable to any other mode of dressing, for promoting a quick suppuration, and leaving a smooth even cicatrix.

3. *Emollient Poultice.* TAKE oat-meal, or coarse flour, and linseed powdered, of each half a pound. Boil them in milk or water to the consistence of a poultice: to which add of sal ammoniac, in powder, one ounce.

This emollient poultice may be applied when there is a great heat, inflammation, or swelling, attending wounds; and by the addition of fresh butter, lard, or oil, may be made of a more relaxing nature.

Many people are indeed prejudiced against the use of poultices, from a wrong notion, that they (as the phrase is) draw humours to be wounded part; but the absurdity of this way of reasoning will be evident to those who are acquainted with the healing art.

"Poultices (says Mr Barlett) are of such real and extensive use in farriery, that we thought the composition of them could not be too general. How simple soever the ingredients may appear to some (which are generally at hand), yet they will be found to answer most

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Wounds in most intentions, where present ease is to be obtained by warmth, softening, and relaxing the injured part. Many are the cases which demand such assistance, as recent swellings, inflammations, treads, bruises, cracked and swelled heels and feet, burns, scalds, bruised and lacerated wounds from stumps, thorns, glass, nails, &c. which last are much better treated with such simple emollient applications, than by hot oils or scalding plasters dropt into the wounds; which, under the absurd notion of drawing, but too often fear up the mouths of the vessels, hinder digestion, and consequently increase both pain and inflammation. In short, it is certain that very great services are daily done by the use of poultices, not only in those disorders to which the human body is incident, but also in those where-with the brute part of the creation is afflicted. One advantage which they have over most outward applications is peculiar to them, that they convey and retain an additional heat, besides what is often in the ingredients; and as most of them have also something emollient in their composition, they must necessarily soften and relax the skin and vessels, abate tension, attenuate and thin viscid and obstructed juices, so that their return into the common course of circulation, or discharge by the pores of the skin, must in general be much better answered by poultices than by other methods."

Poultices may be continued till such time as the wound appears to be well digested (that is, a kindly suppuration of white well-concocted matter), look smooth and equal, free from cavities or excrescences of proud flesh; in that case, the use of poultices may be left off, and the surface of the wound may be sprinkled over with the following mild escharotic powder.

TAKE burnt limestone, that breaks down on being exposed to the air without water, three ounces; Armenian bole, one ounce; rubbed together in a mortar, and put through a fine sieve.

After the wound is sprinkled with this powder, a pledget of dry lint may be fixed gently over it; and, when the surface of the wound is nearly equal with the skin, the powder will be sufficient, without any cloth or covering.

3. There is another species of wounds to which the feet are much exposed, called *punctures*, on account of their small orifice, as the parts immediately after the wound is inflicted readily close up, whereby it becomes difficult to know the depth of the wound. They are generally occasioned from treading upon sharp stones, broken glass, sharp bones, and nails, and likewise from nails in shoeing; either of these perforating the sole or frog, and wounding the internal parts of the foot; which, from their situation and confinement within the hoof, are attended with the most violent pain and inflammation, which are frequently increased by the injudicious method generally observed in treating these wounds when first inflicted, by the application of hot corrosive oils poured into the recent wound, in order to deaden it, which is productive of the worst of consequences. Thus, a fine young chaise-horse, upon a journey, was pricked with a nail in shoeing; which being immediately observed, the farrier poured into the wound oil of vitriol. The horse continued very lame; and, upon the third day, he gave up, not being able to travel any longer. The leg, immediately above the

hoof, swelled to a most enormous size, broke out in different places, and discharged an incredible quantity of bloody matter, by which the whole limb was wasted, and the horse rendered entirely useless.

Punctures or pricks from nails in shoeing, are commonly said to proceed from ignorance or blundering. This may sometimes be the case; but, at the same time, it is an accident that may, and indeed does, happen to the most expert artist; and it is surprising, considering the narrow space there is in some hoofs for driving nails, that it does not happen more frequently. When it is discovered in time, it is easily cured by opening a passage for the matter downwards, and dressing it with any digestive ointment or poultice, and keeping the foot moist, by applying an emollient poultice all round the hoof. But when it is overlooked, or a fragment of the nail remains in the wound, the inflammation increasing, it at last suppurates. The matter accumulating, and not finding a passage downwards, from the natural formation of the hoof, it moves upwards to the coronet or top of the hoof, and forms a round tumour, which afterwards breaks out and degenerates into a most malignant ulcer, commonly termed,

4. A *Quittor-bone*. This tumor is attended with great pain and inflammation, and a considerable swelling round its basis. The method of cure commonly practised, and indeed recommended by authors, especially Dr Braken, is to bore a number of holes into the substance of the tumor with a hot iron, pointed pyramically; and to introduce into these holes small pieces of corrosive sublimate (some even use arsenick), which corrodes and destroys the flesh for some space around them, and at last separates from the sound parts, in a hardened mass of dead mortified flesh, called a *core*, which falls off and leaves a large surface of a wound. But, frequently, a second or sometimes a third operation is found necessary, before the fistula or sinus can be opened to the bottom, and the proud flesh totally overcome, which grows very luxuriantly, and renders the cure tedious, uncertain, and very painful to the animal. Therefore, as this method of cure is attended with so many inconveniences, and is even dangerous from the quantity of sublimate, &c. made use of, which may as readily destroy the ligament of the joint, bones, &c. as the substance of the tumor, it ought never to be used but with caution, and when other means have failed, as it likewise endangers the life of the horse. The knife seems far preferable: first tie a ligature round the fetlock, in order to stop the bleeding; and, with a crooked sharp knife, cut out the tumor to the bottom; afterwards dress it like a fresh wound till it is healed up.

In ulcers of this kind, as there are a number of sinuses or fistulæ which run in different directions underneath the hoof, it is hardly possible to avoid destroying the annular ligament which lies below the coronet, and cutting away a large portion of the hoof; yet, in many cases (especially when there is an opening in the tumor), the method proposed, at the beginning of this section, for curing the deep wounds upon the coronet with seton, may be first tried; and, if that does not succeed, either of the operations abovementioned may be performed.

Punctures differ little or nothing, in the manner of treating

Wounds in treating them, from wounds: only the sole or frog the feet. should be scraped thin all round the orifice of the wound, which, at the same time, if too small, should be enlarged, and the digestive poultice applied, taking care that no fragment or extraneous substance remain in the wound, and keeping the whole hoof moist and soft with emollient poultices around it; and, in cases attended with violent pain, recourse must be had to such internal remedies as are proper in inflammatory cases, such as the following mixture by way of a drink, in order to prevent, as much as possible, an inflammation, or a flux of humours to the afflicted limb, bleeding being first premised, together with using a low soft diet.

TAKE salt of nitre, two ounces; common treacle, two ounces. Dissolve in a quart of water.

It will be necessary to repeat this draught morning and evening; if the horse should show any uneasiness, or appear griped, the quantity of water may be increased or the same quantity of nitre may be given the horse in a mash of bran twice a-day, if it does not cause him loath his food. If the coffin-bone should be wounded and turns carious, it will be tedious to wait for an exfoliation, as, from the spongy texture of this bone, it exfoliates but slowly: therefore, if it can conveniently be done, the carious parts may be scraped off with a knife, and afterwards dressed with pledgets of tow dipped in the tincture of myrrh; and let the poultice be applied above it.

In punctures, as above described, it is a common practice to pour into the wound hot corrosive oils (some even run into the wound an iron nail made red hot), in order, as the phrase is to deaden the parts. In superficial or slight wounds, when perhaps little more than the hoof is wounded, the application of hot oils can hardly be very hurtful: but the barbarous method of pushing a hot nail into a recent wound, cannot fail of being attended with bad consequences, as the cure is unquestionably worse than the disease. But, at all events, when the puncture is deep, either of these cruel methods is extremely hurtful. The wound is said to be of the most inveterate or desperate kind; when, in fact, the bad practice of injudicious applications, &c. escape the just censure they deserve.

5. *Contusions or bruises* happen frequently on the coronet or top of the hoof, from the treading of other horses feet, which will occasion lameness; although, at the same time no external mark of violence will appear on the coronet farther than a little swelling, or the horse will show a sense of pain when the affected part is touched or pressed upon. The following poultice in this case may be applied with success, if continued for some time.

TAKE thick lees of wine or vinegar, one pint; crude sal ammoniac, two ounces; oat-meal or bran, sufficient to make it of a due consistence. Dissolve the sal ammoniac in the lees first.

Before concluding this section, it may not be improper to mention the following rules, which ought carefully to be attended to by every practitioner. 1. The first thing to be observed in dressing of wounds is, to remove all foreign bodies (if it can be done with safety), all lacerated or torn parts, whether of the flesh or of the hoof, &c. which, from their being left in the wound, would greatly impede the cure. 2. All

wounds should be carefully inspected at every dressing, observing attentively whether any alteration has been made on their surface, whether they be clean at the bottom, and free from any extraneous substance that may hinder or retard the cure. 3. Whatever appears mortified, or any fungous or proud flesh, must be removed, either by suppuration, by the knife, or by caustic. 4. Cramming wounds with hard tents, or syringing them frequently with spirituous tinctures, are extremely hurtful. The former increases the pain and inflammation, &c. the latter produces a callus upon the internal surface of the wounds, which prevents their healing. 5. The dressings of wounds should lie smooth and easy upon the parts. 6. Over-tight ligatures or bandages should be carefully avoided. 7. As wounds in the feet or legs, for obvious reasons, are more difficult to heal than on any other part of the body; therefore, rest and a wide stall are absolutely necessary, together with a low regimen or soft diet, in order to keep the body cool and open.

SECT. XLI. *Of that Disease in the Feet commonly called FOUNDERED.*

THE term *foundered* is frequently applied to lame horses in a very vague manner, and without any determined or fixed meaning; for, when a horse shows any defect or impediment in moving his fore-feet, he is then pronounced to be foundered, whether he really has been so or not; that is, according to what is commonly understood by that term, owing to the want or neglect of not making proper distinctions of the different diseases in the feet. If we consult authors who have treated upon this subject, we shall find their accounts of it very dark and imperfect; they bewilder the reader, and convey but a very indistinct idea of the nature of the disease: hence many errors are committed in practice, to the destruction of a number of valuable horses, which otherwise, by proper management, might have been rendered sound and useful. When a horse is first attacked with this disorder, he shows a great restlessness, is hot and feverish, heaves much at the flanks, breathes quick, has a quick strong pulse, and groans much when moved about; at the same time, he shows symptoms of the most violent pain, sometimes in one, but more frequently in both fore-feet; for which reason, he lies down much; but, when forced to move forwards, he draws himself together, as it were into a heap, by bringing forward his hind-feet almost under his shoulders, in order to keep the weight of his body as much as possible from resting upon his fore-feet. In stepping forward, he sets his heel down first with great caution, as afraid of touching the ground. This last symptom should be particularly attended to, as from it we may conclude with certainty that the chief seat of the disorder is in the feet. The hoofs at the same time are exceedingly hot; and, if water is thrown upon them, they dry instantly: if an attempt is made to pull off any of the shoes, the horse shows great uneasiness upon the least twist or pressure made upon any part of the foot, and a great unwillingness to support the weight of his body upon the other foot, especially when they are both alike affected.

It is universally allowed, that the cause of this disease proceeds from too violent exercise, such as riding very

Foundered. very hard upon stony grounds or turnpike roads, and that young horses are most liable to it; and to these we may likewise add, unequal pressure upon the internal parts of the foot, from the concave or hollow form of the common shoes. All these causes combined together, when a horse is of a plethoric or full habit of body, and not accustomed to violent exercise, occasion this disease in a greater or less degree. To form some faint idea of this malady in horses, we may in a great measure appeal to what we experience ourselves in running upon hard ground; for we find, that it occasions a great heat, attended with a smart pain in our feet, which would be greatly increased from uneasy shoes, especially if compelled (like horses) to continue the running for any considerable time. The feet likewise become turgid and painful after a long day's journey, especially if the person is not accustomed to travel; and this inflammation frequently terminates in blisters upon the soles of the feet. Hence it is evident, that, in proportion to the habit of body the horse is in at the time, and the violence of the labour or exercise he has undergone, the inflammation in the internal parts of the foot will be more or less violent, and attended with all the symptoms already mentioned.

This disease, then, appears from the symptoms attending it, and the effects it afterwards produces in the feet, to be, in its first stage, an inflammation of the internal parts of the feet, arising from the violent exercise, which occasions a more than ordinary determination of the blood to the feet: hence that rapid circulation of the blood in the vessels within the hoof, which frequently terminates in a rupture of these vessels, and of course an extravasation of the blood, and, in some cases, a total separation of the horny substance of the hoof from the aponeurotic fibres upon the fore-part of the coffin-bone; whilst in others, where it has been less violent, a concretion or growing together of the parts within the hoof has taken place, so as to appear upon dissection one solid mass; and hence lameness.

Thus, a young chaise-horse, after a hard day's work, was attacked with all the symptoms already mentioned, and was treated in the common manner as above related, that is, rowelled, &c. In a few weeks after the disease had taken its course in the ordinary way, he was put under the author's care. The sole, a little before the point of the frog, in one of his fore-feet, became soft; and having a curiosity to see the cause of it, the author cut away the sole, which was but thin, and found a cavity containing a reddish coloured liquor: after removing the ragged parts of the hoof, a large transverse opening showed itself, into which a probe was introduced upwards between the coffin-bone and the hoof; the connection between the tendinous fibres upon the surface of the coffin-bone and the hoof was destroyed at the fore-part or toe; the bone, losing part of its support, pressed down upon the horny sole, and produced that swelling or convexity of its surface, which is called a *high, round, or pumice sole*. The hoof lost its former shape, growing narrow towards the toe, with a preternatural thickness of the horny substance of the crust, whilst the quarters or sides of the hoof were decayed, thin, and full of deep wrinkles, together with a hollowness upon the surface

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of the upper part of the hoof, the whole foot having a Foundered. diseased appearance. When the horse had recovered so far as to be able to walk, in going forward he threw out his legs well before him, but drew them backwards before he set his foot to the ground; setting the heel down first with great caution, upon which he rested most, the toe being turned a little upwards. From this symptom only, we may judge with certainty, even though at a distance, upon seeing a horse walk, whether he has ever been foundered or not.

This disease proves still more violent, and indeed sometimes fatal, if the horse has been allowed to stand in cold water when his feet are overheated. Thus, a saddle-horse, after being rode very hard, was turned loose into a stable-yard all over in a sweat; he went immediately into the water-pond, where he was suffered to stand for a considerable time in very cold weather: a few hours afterwards he was seized with a most violent fever, and a great pain in his fore-feet: he lay upon the litter for some days in the greatest agony; and at last both his hoofs dropt off, occasioned by a mortification brought upon the parts from the application of the cold water, which rendered him entirely useless.

From what has been said with respect to this disease, it is evident, that as the circulation is greatly increased, and the current of blood chiefly determined towards the fore-feet, attended with symptoms of the most violent pain, we may thence conclude, that there is an inflammation in these parts: therefore the cure must first be attempted by diminishing the circulation of the blood, giving cooling salts internally, glysters, an opening diet, and plenty of diluting liquor four or five times a-day, together with emollient poultices applied warm all round the hoofs, in order to soften them, and keep up a free and equal perspiration; observing, that his shoes be easy upon his feet; but by no means to pare the sole or frog to that excess which is commonly done in cases of this kind, farther than cleaning away the hardened surface of the sole and frog, in order that the poultice may have the desired effect, by increasing the perspiration through the pores; and to avoid all manner of greasy or oily applications to the hoofs, for the reasons already mentioned.

In all violent inflammations, there is nothing which contributes more to give immediate relief, than plentiful bleeding timeously performed; and which ought by no means to be neglected, or too long delayed: for, in cases of this nature, although the fever may be so far overcome by strength of constitution, or prevented by medicines from destroying the life of the animal; yet the effects of it will ever afterwards remain, and, of course, the horse will be lame for life. But, in order to judge properly when this operation may be necessary, the pulse must be attended to, the knowledge of which is of the utmost importance in the practice of farriery, and should be more generally studied, as it is the only criterion or rule by which we may be directed when bleeding is necessary, or when it ought to be avoided. But when this operation is neglected, and the cure is first attempted by rowels, &c. it is a long time before they can come to a proper suppuration, on account of the violence of the fever. Hence, in place of suppurating, they sometimes turn

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into

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into a gangrene, by which many horses lose their lives. But, at all events, before the rowels could have any effect, even allowing they were to suppurate in the common time (which is about three days), the inflammation within the hoof will by that time have taken place, and its consequences will follow, to the ruin of the feet, and, of course, the loss of the horse.

The manner in which a horse walks or stands upon his fore parts, when affected with this disorder, has induced many practitioners, &c. to conclude, that the shoulders are affected: hence they say a horse is foundered in the body; and that drains, such as rowels, are the only proper remedies. But granting there was a stiffness, &c. all over the body, which is frequently the case in the beginning of inflammatory fevers, bleeding ought to be premised, as the first necessary step towards the cure.

SECT. XLII. *Hoof-Bound.*

THIS complaint affects the hoofs differently, according to their natural shape, and the treatment they are exposed to, whether from injudicious shoeing, keeping the hoofs too hot and dry, or paring the sole and binders at every time they are shod. Some are affected with a circular contraction of the crust, compressing the whole foot. In others, the crust is contracted at the coronet only, compressing the annular ligament, &c. A third kind is, when either one or both heels are contracted: hence, therefore, in proportion to the degree of contraction, the internal parts of the foot are compressed, and the horse becomes more or less lame.

It has been already observed, Sect. xxxix. that deep-crufted narrow hoofs, or what are commonly called *asses hoofs*, are naturally disposed to this malady: when they become diseased, they are easily known from their appearance, as they are smaller in proportion than the legs, and frequently smaller at their basis than at the coronet; the crust of the heels is high, thick, and strong; the frog wasted and rotten; the hoofs are almost perpendicular; the horse moves in pain, steps short and quick, and trips and stumbles frequently; it is not uncommon that one foot only is affected, which then appears considerably smaller than the other.

This disease is hastened and brought on by paring and hollowing out the sole and binders at every time the shoes are renewed, from a mistaken notion of widening the heels; hence they are thereby made so very thin, that the crust at the extremity of the heels may be forced almost close to one another even with one's fingers: and what greatly forwards the complaint, is the form of the shoes commonly used, which are made hollow; for this practice of hollowing the shoes so universally prevails, that, without any regard to the shape of the sole, whether it be flat or otherwise, the shoe is made concave or hollow upon that side which is placed next the foot. Hence the outer edges of the concave shoes force the crusts at the heels nearer to one another: which being there retained, the contraction of the hoof becomes general, and confirmed beyond the power of art or remedy.

In the second species of this complaint, the hoof acquires a particular shape, which Mr Gibson, in his *Farriery*, compares to that of a bell; that is, the hoof appears contracted and tight round the coronet and

instep, but spreads wider downwards to its basis; the hoof in other respects looks well and sound. This is generally occasioned by keeping the horse standing for a long time together in the stable upon hot dry litter, without moistening and cooling the hoofs, allowing them at the same time to grow to a preternatural size both in length and breadth: hence, from the great strength, the rigidity and dryness of the under part of the hoof, a preternatural stricture or pressure is made by the hardened crust at the coronet, which compresses the annular ligament and parts near it.

The third species of this malady is, when either one or both heels are contracted. This frequently happens even in all kinds of hoofs, but more especially in those that are flat, from the use of concave or hollow shoes, together with cutting out the sole and binders at every time the horse is shod. But it more frequently happens, that the inside heel only is contracted, from the natural weakness of that part of the hoof: hence the weight of the limb, &c. pressing upon the inside crust at the heel, it is inflected or bended inwards; by which, together with concave form of the shoe, and loss of substance from paring, &c. the disorder is increased, the crust of the heels becomes contracted, and compresses that quarter of the foot, and of course occasions lameness.

With respect to any particular method of cure to be observed in removing this disease, all that can be said is, That, it is one of that kind which comes on gradually and perceptibly, it may by proper care and management, when properly attended to, be prevented. But when once it becomes confirmed, it never will admit of a thorough cure. Nevertheless, it may be so far palliated as to render a horse in some degree sounder, by keeping the hoofs cool and moist; as, in this case, they are naturally disposed to be very hot, dry, and hard, his shoes should be flat, narrow, and open heeled, the hoofs never greased nor oiled, the soles never pared. But as the crusts of the heels in these hoofs are preternaturally high and strong, they should always be pared down till they are lower than the frog, that it if possible, may rest upon the ground. This operation will tend to remove that stricture from the heels and frog, which will greatly relieve them. But many people, adhering too strictly to that general rule, which from inattention has crept into practice, viz. of paring down the toes, and keeping the heels entire, without reflecting upon the shape or natural formation of the particular hoofs, continue the same practice upon deep-crufted, high-heeled hoofs, which is only necessary to be observed in long-toed hoofs with low heels, and thereby this disorder is greatly increased; the weight of the body is likewise thrown forwards, by which the horse stands too much upon his toes; and hence the leg-bones, from the awkward habit of the horse's standing, become bent at the joints, and occasion what is called *knuckeling* or *nuckeling*.

The second species of this complaint, is when the crust at the coronet becomes contracted; and compressing the annular ligament, &c. occasions lameness, the hoof acquiring that shape formerly compared to that of a bell. Different methods have been tried and recommended for the cure. Mr Gibson proposes to make several lines or rases on the fore-part of the hoof with a drawing knife, almost to the quick, from the coronet down

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down to its basis, and turning the horse out to grass;: others after this operation is performed, screw the heels wide by means of a screwed shoe: a third method practised is, to draw the sole, and divide the fleshy substance of the frog with a knife, and keeping it separated by the screwed shoe abovementioned: a fourth method in use, is to make the inner-rim of the shoe-heel very thick on the under side (its upper surface being quite flat); and by making it rest upon the binders and sole at the extremity of the heels, by pressure from the weight of the body, the heels are forced to recede to a greater distance from one another. Either of these methods may indeed in a small degree widen or expand the horny substance of the crust, and may be of use in recent contractions. But when once it has become confirmed, and is of some standing, no means whatever can then restore the internal parts to their primitive state; for as the contraction takes place, the tender parts within the hoof being compressed, lose their tone, and diminish in their size. The blood-vessels become impervious; hence a decay or wasting of the whole foot, and not unfrequently a concretion of the parts, and of course the impossibility of the horse ever becoming sound. But as it has been observed, that the cause of this species of the complaint now under consideration proceeds from allowing the hoofs to grow to an extraordinary size, and keeping them too hot and dry, by which they acquire a rigidity and dryness, occasioning a preternatural compression upon the coronet; to remove which (as the case will only admit of palliation), the surface of the hoof at its basis must be pared down till the blood appears, the thick strong crust upon the outside towards the toe rasped in the same manner, and the horse turned out to grass in soft meadow-ground till the feet recover. But it must be observed, that if both hoofs are alike affected, one of them at one time only should be treated in the manner directed, as a tenderness will remain for some days, which might prevent the horse from walking about in search of food.

The third species is a contraction of one, or sometimes of both heels, in flat feet, from the use of concave shoes, &c. Where it has not been of a very long standing, it may, by proper management, be greatly relieved, by laying aside the use of concave shoes, and refraining from paring the sole, &c. But to remove the stricture of the hoof more immediately, the whole contracted quarter of the crust near the heel must be rasped or pared to the quick, from the coronet to its basis, close to the frog, taking care to avoid drawing blood, putting on a barred shoe, causing the shoe-bar to press upon the frog, keeping the hoof cool and moist, or turning the horse out to grass. Hence the pressure from the contracted hoof being removed, and the frog at the same time resting upon the bar of the shoe, the contracted quarter is thereby dilated or expanded: the new hoof growing from the coronet downwards, acquires a round, full shape, and becomes of its original form.

From what has been said concerning this disorder in the feet of horses, it is evident, what little prospect there is of effecting a thorough cure by art, as the complaint is of such a nature as only to admit of some palliation, and even then in some very favourable cases only. Nevertheless, it is practicable to prevent

contractions in the hoofs from taking place, even in those hoofs which are seemingly disposed that way from their shape, &c. by observing the rules already laid down, viz. by keeping the hoofs moist and cool, which is their natural state: using flat shoes, from which the hoofs can acquire no bad shape; allowing the sole and frog to continue in their full strength the latter especially to rest upon the ground; and keeping the crust within due bounds, not suffering it to grow too long towards the toe, nor too high at the heels.

SECT. XLIII. *Of Corns.*

Corns.

IN the human body, corns in the feet are termed so with some propriety, from their horny substance; but what are called *corns* in the feet of horses, are very improperly named, as they are quite of an opposite nature, rather resembling contusions or bruises and not unlike those bruises which happen in the palms of the hands and fingers to working people arising from violent pinching, bruising, &c. where the skin is thick, which appears of a blackish red colour, and exceedingly painful at first containing blood; but in the end, the serum or thinner parts being absorbed, the red particles appear when the dead skin is removed, like red powder. In like manner corns, or rather bruises, appear red and *foxy*, as the phrase is. They are situated in the corner or sharp angle of the sole at the extremity of the heels, where the crust reflects inward and forward, forming the binders. But they are more frequently to be met with in the inside heel, from the manner of the horse's standing, together with the pressure or weight of the body, which is greater upon the inside of the hoof than the outside. Bruises of this kind are exceedingly painful, insomuch that the horse shrinks and stumbles when any thing touches or presses upon that quarter of the hoof; hence lameness.

This complaint arises from different causes, according to the shape or natural formation of the hoof, together with the treatment they are exposed to. But the following are the most frequent.

1st, In flat low heels, from too great a pressure of the shoe-heel upon the sole, whether from caulkers, a too great thickness of iron upon the heels of the shoe, or its being bended downwards upon the sole, or the shoe made too concave; either of these causes will produce the same effect; for, from the too great pressure upon the horny sole, the fleshy sole, which lies immediately underneath it, is compressed and bruised between the shoe-heel, the sole, and the extremities or outward points of the coffin-bone; and hence a contusion or bruise, attended with an extravasation of the blood, which afterwards gives that part of the sole a red appearance, and is the reason why the sole on that place never grows up so firm and solid as it was before, but remains soft and spongy, forming a lodgement for sand and gravel, which frequently insinuates itself into the quick, causing an inflammation, attended with a suppuration or discharge of matter, which, if not finding a passage below, will break out at the coronet.

2^d, This complaint is produced in wide open heels, when the hoofs are very thick and strong, from too great a luxuriance of the binder, which being inflected or bended downwards between the shoe and the sole,

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sole, compresses the fleshy sole, as already mentioned ; and hence lameness.

3d, This malady, in deep narrow hoofs, proceeds from a contraction of the crust compressing the heels, &c. Hence, it not unfrequently happens in hoofs of this shape, that both heels are alike affected from the stricture and pressure of the hardened crust upon the tendinous aponeurosis, &c. on the outside of the coffin-bone, which in this case is bruised between the bone and the crust : hence the redness may sometimes be traced upwards almost to the coronet. In this case no radical cure can be take place, as the cause which produces these bruises, &c. will exist while the horse lives, and at the same time the horse will be lame from the contraction of the hoof ; but the remedy proposed in the preceding section, by way of palliation for hoof-bound feet, may be of use to render the horse in some measure more serviceable.

With respect to the two first causes, when the bruise proceeds from too great a pressure from the shoe-heels, &c. upon the sole, the shoe must be made so as to bear off the tender part, and likewise to some distance on both sides of it ; for which purpose, a round or a barred shoe will be necessary. The red and bruised parts must be cut out to the quick, and the hoof kept soft with emollient poultices for some time. But the texture of the blood-vessels, and likewise that of the hoof at the bruised part, being destroyed, a sponginess remains afterwards, and upon the least unequal pressure from the shoe, &c. are liable to a relapse, never admitting of a thorough cure, and of consequence subject to frequent lameness.

Corns or bruises in the feet of horses might, by taking proper care of them, be easily avoided : for in those countries where horses go mostly barefooted, this malady is not so much as known ; neither are those horses that go constantly at cart and plough subject to them : hence, therefore, this complaint is most frequently to be met with in great towns, where horses go much upon hard causeway, having their shoes turned up with high caulkers on the heels, and frequently renewed, at the same time their hoofs being kept too dry and hard, from standing too much upon hot dry litter ; hence will appear the necessity of complying with what is most natural to the hoofs of horses, namely, coolness and moisture, together with using such a form of shoe as will press equally upon the circumference of the crust, and without giving it any bad unnatural shape. See sect. xlvii.

SECT. XLIV. Of Running Thrushes.

I. A RUNNING THRUSH (or FRUSH), is a discharge of a fetid, and sometimes ichorous, matter, from the cleft in the middle of the frog, affecting one, frequently both, and in some cases all the four feet. But, generally, the fore-feet are most subject to this disease. In most cases, it seldom admits of a radical cure ; but is subject to frequent relapses, occasioning lameness, from the rawness and tenderness of the parts affected, on being exposed to sand, gravel, &c. or in rough ground, from the heels treading on sharp stones, &c. and when the horse happens to be of a bad habit of body, they even degenerate into what is commonly called a *sinker*.

Running thrushes, according to Mr Gibson, " are

sometimes profitable to horses of fleshy and soul constitutions ; because (says he) they drain off a great many bad humours." But however salutary or beneficial they may be in some particular constitutions, yet, upon the whole, they prove extremely troublesome, on account of the lameness and tenderness of the feet affected with them ; and, where there occurs one case in which they may properly be said to become beneficial to the constitution, there are a far greater number in which they are hurtful, as they are brought on by the treatment the hoofs are exposed to, together with the injudicious method generally observed in shoeing them, particularly in those hoofs that are narrow-heeled, or disposed to be hoof-bound, running thrushes being always an attendant upon that complaint. But, to explain this more particularly, there is, in the middle of the frog, a cleft or opening, by which the heels in a natural state have a small degree of contraction and expansion, especially when the horse treads or presses his heel upon the ground, the frog then expands ; when, therefore, a horse is shod with concave or hollow shoes, the heels are deprived of that power of expansion, being constantly confined in a contracted state by the resistance from the outer edges of the concave shoe, by which the frog is pressed or squeezed on both sides, by the crust of the heels being brought nearer to or almost into contact with one another. Hence pain, inflammation, an obstruction of the blood, &c. (in the fleshy substance of the frog), and of course that wasting and rottenness of its external covering, which, falling off in pieces, leaves the quick almost bare ; the new frog, growing in detached pieces, never acquires the solidity of the former ; and hence that rawness and tenderness which ever afterwards remain, and that extreme sensibility of pain when any hard substance touches that part of the foot, and of course subject the horse to frequent lameness. There are no doubt, other causes which may be said to occasion this malady, even in those hoofs that are wide and open at the heels, where there is not the least appearance of a contraction at the heels : but these are generally owing to the treatment the hoofs are exposed to in the stable, by keeping them too hot and dry for a long tract of time together, during which the natural perspiration is greatly obstructed, by the constant application of grease or oil to the hardened hoofs, and stuffing them up with hot, resinous and greasy mixtures, as tar, turpentine, &c. the horse being all the while kept at full feeding, and not having proper and necessary exercise to promote the circulation of the fluids, and to forward the ordinary secretions, &c. : the legs swell and inflame ; at last a running in the frog appears ; and hence this discharge is said to be beneficial to the constitution, when in fact it is but too frequently brought on by a slothful neglect, and kept up by bad management. Fresh air and regular exercise are essentially necessary towards preserving horses in an active healthy state ; for running thrushes, like other diseases to which pampered horses are subject, are not known in those countries where horses run at large in the fields ; neither are they so frequently to be met with in the country amongst labouring horses, whose exercise is regular, and whose hoofs are much exposed to coolness and moisture, the natural state of the feet of horses.

With respect to the cure of running thrushes, it has been

Runnig Thrushes.

Running
Thrushes.

been hinted, that in most cases, especially where it has been of long standing, affecting all the frogs more or less, it is impracticable to eradicate it by any assistance from art. For instance, when it proceeds from contracted narrow heels in those feet which are said to be hoof-bound, it is then an attendant only on that disease; and therefore cannot be cured without removing the first cause, though then it will only admit of some small degree of palliation*. But in those hoofs which are wide and open at the heels, where the complaint is recent, one or both the fore-feet only being affected, and where there is reason to suspect that it proceeds from the use of concave or hollow shoes, or keeping the hoofs too hot, dry, and hard, the cure then may be completed with ease and safety by laying aside the use of concave shoes, washing the frogs clean after exercise, and dressing them with *Mel Egyptiacum*, made as follows.

* See Sect.
XIII.

Mel Egyptiacum. Verdegris in fine powder, two ounces; honey six ounces; vinegar four ounces; boil them over a gentle fire till they have acquired a reddish colour.

Or a solution of blue vitriol.

Solution of vitriol. Blue vitriol powdered, one ounce; water, one quart:

keeping the hoofs cool and moist. But, at the same time, recourse must be had to internal remedies by way of revulsion, as purging or diuretic medicines, bleeding being first premised: if the former is made choice of, twice or thrice will be sufficient, repeated at proper intervals; but if the latter, which seems preferable, they may be continued for some time with great safety, without losing one day's work of the horse.

In some cases, there is frequently not only a discharge of fetid matter from the clefts of the frogs; but, at the same time, a discharge of greasy-like matter from the round protuberances of the heels, and the hollow of the pastern joints. It will be necessary, therefore, to make a distinction between the matter discharged in this case, which appears of a thick, white, clammy, or soapy consistence, and that running in the legs commonly termed a *grease*, which is of a quite opposite quality; the latter by good management will admit of a thorough cure, whilst the former baffles all the power of medicine.

2. In horses of a gross habit of body, especially the heavy draught-kind, running thrushes sometimes degenerate into what is commonly called a *canker*. In this case, the horny substance of the frog is soon thrown off; the fleshy parts grow to an immoderate size, the luxuriant substance or spongy flesh having a great number of papillæ or tubercles, which Mr Gibson compares not improperly to cauliflower, the colour only excepted, which is of a pale red, and sometimes variegated and tinged with blood; attended with a copious discharge of a thin ichorous fetid humour, having a most offensive smell. If its progress be not speedily stopped, the fleshy sole, from its vicinity, becomes likewise affected; the horny sole rots, decays, and falls off; the whole foot turns into a kind of quag or bog (in warm weather full of maggots, which it is almost impossible to prevent, even with the most corrosive dressings); the tendons become likewise affected, the bones carious, the hoof falls off, and the horse is rendered useless. To prevent these and the like consequences,

as soon as a running thrush begins to show the least malignant disposition, proper means must be used to correct the habit of body, and to divert this discharge to some other outlet, either by purging or diuretic remedies, continued for some time, bleeding being first premised. As to external applications, the first thing necessary to be done, is to pare down the crust till it is lower than the fungus, or growth of the canker, and to remove any hard pieces of the hoof or sole wherever it presses upon the tender parts; the circular part of the crust should be surrounded and kept soft with an emollient poultice. For dressings, the mildest escharotic powders may be first tried, as the following:

TAKE burnt alum powdered two ounces; blue vitriol powdered one ounce.

But when it degenerates into the last species mentioned above, affecting the fleshy sole, &c. the strongest corrosive applications will then be necessary, and sometimes hardly sufficient to keep down the luxuriance of the fungus. The caustic oils are found preferable, as ol. vitriol. aquafortis, butter of antimony: either of these may be applied once every day; otherwise, if neglected dressing too long, or to every other day, which is the common practice, the great humidity and moisture issuing from the fungus so weakens the force of the strongest oils, that they have little or no effect: when these sharp dressings seem to gain upon the canker, it may be dressed with equal parts of red precipitate and burnt alum pounded and mixed together, till such time as the new sole begins to grow; the purging or diuretic medicines being given at proper intervals till the cure is completed.

SECT. XLV. Of False-quarter, and Sand-cracks.

1. What is commonly called *false-quarter* in the foot of an horse, is a cleft or chink in the side or quarter of the hoof, running in a slanting direction with the horny fibres of the hoof, from the coronet to its basis, by which the horny substance of the crust is divided; one part of the hoof being in a manner detached from the other, and rendered unable to sustain its portion or share of the weight of the limb, &c. and hence the name of *false-quarter*: for, when the horse sets his foot on the ground, the chink widens; but, when it is lifted up, the hardened edges of the divided hoof take in between them the tender and soft parts, and squeeze them so as to occasion frequent bleeding at the chink, and is frequently attended with inflammation, a discharge of matter, and of course lameness.

This complaint, notwithstanding the different accounts commonly given as to the cause of it, is in fact the effect of a deep wound or bruise upon the coronet, by which the continuity of the parts has been entirely broke off; for we always find, that when the horny fibres are divided at their roots, they never unite or grow up as before, but leave a blemish, more or less, in proportion to the size and deepness of such wounds, &c. We have many instances of this, even in the human body; for when a wound happens at the roots of the nails, whether in the fingers or toes, it occasions a blemish, which continues to grow in the same manner afterwards. Hence it will be evident, that no radical cure can possibly take place; but we may so far palliate the complaint as to render the horse something useful, by using a shoe of such a construction

False-quarter
and
Sand-crack

Falfe-quarter and Sand-cracks

tion as will support the weight of the limb, &c. without resting or pressing too much upon the weakened quarter; for which purpose, a round, or what is called a *barred shoe*, will be most proper. The surface of the hoof, on and near the diseased part may be cut down lower than the surface of the crust upon which the shoe is to rest; or, if the hoof will not admit of being cut down, the shoe may be raised up from the weak quarter. Either of these means will remove the weight of the body from the diseased part, and the horse will go sounder.

But as sand and gravel is easily admitted into the chink or crack, where, being accumulated and pent up, it irritates and inflames the parts, whereby matter is formed underneath the hoof, which causes lameness, and which not unfrequently breaks out at the coronet, producing the most inveterate ulcers, which become extremely difficult to heal, on account of the sinus or fistula branching out in different directions underneath the hoof: therefore, horses with this defect should be carefully observed; and, when the thick hardened edges of the chink or crack grow too high, by which it is so much the deeper, and, of course, lodges the greater quantity of sand, &c. these edges should be rasped or pared with a crooked knife, till the seam disappears. But wherever there remains a blackness, or appearance of gravel, that part must be tracked farther; always observing, if possible, to avoid drawing of blood. The chink or crack thus made smooth and equal, no sand or gravel can lodge in it; and as the parts will be tender, it will be necessary to apply an emollient poultice for some days, till the tenderness wear off. If the inflammation has been great, and matter formed in the crack, or the parts wounded by the knife in cutting its hardened edges, proud flesh may rise and jet out. In this case, the hard parts of the hoof near it are to be removed, a digestive poultice applied; and when the inflammation is abated, the proud flesh may be touched with the following corrosive powder:

TAKE blue vitriol burnt, two drams; corrosive sublimate, one dram; rubbed into powder.

2. A *sand-crack* is of much the same nature with a false-quarter; only they run more frequently in an horizontal direction than the latter, on the outside or surface of the crust: they are generally the effect of slight or superficial wounds upon the coronet, and grow gradually downwards towards the basis of the hoof, and at last are cut or rasped off in the shoeing; when they occasion lameness from lodging sand or gravel, they must be treated in the same manner as already mentioned for *Falfe-quarters*.

SECT. XLVI. *Of Horses cutting their Legs in Travelling.*

HORSES frequently cut their legs both before and behind, by striking or knocking the hoof when trotting, &c. against the opposite leg, whereby a wound is made, which is attended with an inflammation, swelling, &c. and of course lameness. The parts commonly wounded from cutting in the fore-legs, are the prominent and back part of the fetlock joint; and under the knee joint on the inside of the leg. The former is most common: the latter only happens to those

horses who raise their feet high in trotting; and, as such horses generally go fast, this last species of cutting is distinguished by the name of the *swift* or *speedy cut*. *Cutting.*

In the hind legs, horses cut themselves upon the prominent part of the fetlock-joint; and sometimes, especially those who move their legs too low, cut upon their coronet. But whether they cut before or behind, it commonly proceeds from some of the following causes.

1st, Injudicious shoeing; under which may be included, the hoofs being suffered to grow too large and broad, the shoe projecting over the inside edge of the hoof, the clenches or rivets of the nails rising above the surface of the crust.

There are a great variety of shoes recommended for preventing this complaint, of different constructions: but the most common are those that are made thick upon the inside heel. Others have a border or margin turned up upon the inside of the shoe's rim, commonly called a *feather*, which raises the inside of the hoof considerably higher from the ground than the outside. Either of these shoes may be of use to a dealer, in order to make a wry-footed horse appear to stand straight upon his limbs; but can have no effect upon a horse's manner of moving his legs, especially at the time when the foot is raised from the ground, and passing by the other leg, so as to prevent him from cutting. The reason why this method of shoeing seems to succeed, especially in the hind-feet, is this; when the shoe is made thick upon the inside heel, which part commonly strikes the opposite leg, the shoe-nails are removed to a considerable distance forward from the thick part of the shoe, which, at the same time, is kept much within the circle of the hoof; and, on that account, it becomes impossible that the shoe should touch the opposite leg. But, to show that this raising of the inside quarter or heel, by a thickness of iron in the shoe, is not necessary to prevent horses from cutting, the author has frequently caused the heel of the shoe to be made thinner than common; and, by keeping it within the hoof, it answered equally well with the former: he has likewise caused the shoe to be cut in the middle of the quarter, whereby the hoof at the heel was left quite bare; which answered the purpose so much the better, as the foot was the less loaded with the additional weight of superfluous iron.

2^d, The great weight of the concave shoes commonly used, is likewise another cause why horses, that in other respects move well upon their legs, do frequently cut and wound themselves; and to this we may add, the great length of the hoof at the toe, especially in the fore-feet, which is allowed frequently to grow to an unnatural size. It has been already observed, that a great load of iron is by no means necessary in a horse's shoe: on the contrary, it becomes a great disadvantage; for a flat one that is properly constructed, and well wrought, that is, well hammered, will wear as long as a concave or hollow shoe that is almost double the weight of the former. This, at first view, will perhaps, appear a paradox; but, nevertheless, it is a fact: for as the round or outward surface of a concave shoe is the only part that touches the ground, and is liable to be worn, it soon grows thin, and yields to the pressure from the weight of the body; and therefore

Cutting.

fore must be renewed before the other parts of it are hardly touched, and but little reduced in its original weight. But the surface of a flat shoe, resting equally upon the ground, will remain firm upon the hoof, and be sufficiently strong to support the weight of the body till it wears very thin.

When horses cut or wound themselves immediately under the knee joint, this is called the *swift* or *speedy cut*; and is occasioned by raising the feet high in trotting, whereby the inside toe or quarter of the hoof strikes against the opposite leg. This is easily prevented by making the shoe straight, and placing it considerably within the hoof at the part where the hoof strikes the other leg, observing that no nails are to be put in that part of the shoe which is kept so much within the hoof, otherwise they must immediately plunge into the quick.

3d, When cutting proceeds from a natural defect, that is, a wrong position of the foot upon the leg-bones, whereby the toes are turned too much outward or too much inward; at the same time, if the horse crosses his legs much in trotting; in this case there is no preventing his cutting altogether, though it may be palliated. Such horses are by no means fit for journey-riding, being generally addicted both to cutting and stumbling.

In the *last* place, it may proceed from fatigue or weakness. This happens frequently, even to those horses that deal their legs well (as the phrase is), especially in young horses; but they soon leave it off when they acquire more strength, and are accustomed to their work: most people must have experienced this in themselves when boys, as they at that age are very ready to knock their ancles with the heel of the opposite shoe, which custom wears off as they grow strong. Upon the whole, the best general rule that can be laid down for preventing horses from cutting their legs, is to keep their hoofs round and short at the toe, and from growing too large and broad: to observe that the shoe does not project over the inside edge of the hoof; that the clenches or rivets of the nails on the outer surface of the crust are smooth; and, above all, that the shoe be made light, well worked, and properly proportioned to the size of the foot. See the following head.

SECT. XLVII. SHOEING of HORSES.

HORSES are shod in order to defend and preserve their hoofs. As feet differ, so should shoes accordingly. "The only system of farriers, (Lord Pembroke observes), is to shoe in general with excessive heavy and clumsy ill-shaped shoes, and very many nails, to the total destruction of the foot. The cramps they annex, tend to destroy the bullet; and the shoes made in the shape of a walnut-shell prevent the horse's walking upon the firm basis which God has given him for that end, and thereby oblige him to stumble and fall. They totally pare away also and lay bare the inside of the animal's foot with their detestable butteries, and afterwards put on very long shoes, whereby the foot is hindered from having any pressure at all upon the heels, which pressure otherwise might still perchance, notwithstanding their dreadful cutting, keep the heels properly open, and the foot in good order. The frog should never be cut out; but as it will sometimes be-

come ragged, it must be cleaned every now and then, and the ragged pieces pared off with a knife. In one kind of foot indeed a considerable cutting away must be allowed of, but not of the frog: we mean, that very high feet must be cut down to a proper height; because, if they were not, the frog, though not cut, would still be so far above the ground, as not to have any bearing upon it, whereby the great tendon must inevitably be damaged, and consequently the horse would go lame.

"The weight of shoes must greatly depend on the quality and hardness of the iron. If the iron be very good, it will not bend: and in this case the shoes cannot possibly be made too light: care, however, must be taken, that they be of a thickness so as not to bend; for bending would force out the nails, and ruin the hoof. That part of the shoe which is next the horse's heel, must be narrower than any other, (as is seen in the draught, Plate CLXXXIX.) that stones may be thereby prevented from getting under it, and sticking there: which otherwise would be the case; because the iron, when it advances inwardly beyond the bearing of the foot, forms a cavity, wherein stones being lodged would remain and, by pressing against the foot, lame the horse. The part of the shoe which the horse walks upon should be quite flat, and the inside of it likewise; only just space enough being left next the foot to put in a picker (which ought to be used every time the horse comes into the stable), and also to prevent the shoe's pressing upon the sole. Four nails on each side hold better than a greater number, and keep the hoof in a far better state. The toe of the horse must be cut short, and nearly square (the angles only rounded off); nor must any nails be driven there: this method prevents much stumbling, especially in descents; and serves, by throwing nourishment to the heels, to strengthen them: on them the horse should in some measure walk, and the shoe be made of a proper length accordingly; by this means, narrow heels are prevented, and many other good effects produced. Many people drive a nail at the toe, but it is an absurd practice. Leaving room to drive one there carves the foot to be of an improper length; and moreover, that part of the hoof is naturally so brittle, that even when it is kept well greased, the nail there seldom stays in, but tears out and damages the hoof. That the directions for shoeing a proper length may be the more clear and intelligible, we have annexed a draught of a foot shod a proper length standing on a plain surface, and with it a draught of the right kind of shoe.

"In wet, spongy, and soft ground, where the foot sinks in, the pressure upon the heels is of course greater than on hard ground; and so indeed it should be upon all accounts. The hinder feet must be treated in the same manner as the fore-ones; and the shoes the same; except in hilly and slippery countries, they may not improperly be turned up a little behind; but turning up the fore-shoes is of no service, and is certain ruin to the fore-legs, especially to the bullets. In descending hills, cramps are apt to throw horses down, by stopping the fore-legs, out of their proper basis and natural bearing, when the hinder ones are rapidly pressed; which unavoidably must be the case, and consequently cannot but push the horse upon his nose. With them

Shoeing.

Shoeing. them on a plain surface, a horse's foot is always thrown forwards on the toe, out of its proper bearing, which is very liable to make the horse stumble. The notion of their utility in going up hills is a false one. In ascending, the toe is the first part of the foot which bears on, takes hold of the ground, and whether the horse draws or carries, consequently the business is done before the part where the cramps are comes to the ground. Ice-nails are preferable to any thing to prevent slipping, as also to help horses up hill, the most forward ones taking hold of the ground early, considerably before the heels touch the ground: they must be so made, as to be, when driven in, scarce half an inch above the shoe, and also have four sides ending at the top in a point. They are of great service to prevent slipping on all kinds of places; and by means of them a horse is not thrown out of his proper basis. They must be made of very good iron; if they are not, the heads of them will be perpetually breaking off. From the race-horse to the cart horse, the same system of shoeing should be observed. The size, thickness, and weight of them only should differ. The shoe of a race-horse must of course be lighter than that of a saddle-horse; that of a saddle-horse lighter than that of a coach or bat horse; and these last more so than a cart, waggon, or artillery-horse. At present all shoes in general are too heavy; if the iron is good, shoes need not be so thick as they are now generally made.—The utmost severity ought to be inflicted upon all those who clap shoes on hot: this unpardonable laziness of farriers in making feet thus fit shoes, instead of shoes fitting feet, dries up the hoof, and utterly destroys them. Frequent removals of shoes are detrimental, and tear the foot; but sometimes they are very necessary: this is an inconvenience which half-shoes are liable to; for the end of the shoe, being very short, is apt to work soon into the foot, and consequently must then be moved."

In a late treatise on this subject by Mr Clark of Edinburgh, the common form of shoes, and method of shoeing, are, with great appearance of reason, totally condemned, and a new form and method recommended, which seem founded on rational principles, and to have been confirmed by experience.

Common method. "In preparing the foot for the shoe, our author observes, the frog, the sole, and the bars or binders, are pared so much that the blood frequently appears. The shoe by its form (being thick on the inside of the rim, and thin upon the outside*), must of consequence be made concave or hollow on that side which is placed immediately next the foot, in order to prevent its resting upon the sole. The shoes are generally of an immoderate weight and length, and every means is used to prevent the frog from resting upon the ground, by making the shoe-heels thick, broad, and strong, or raising cramps or cankers on them.

"From this form of the shoe, and from this method of treating the hoof, the frog is raised to a considerable height above the ground, the heels are deprived of that substance which was provided by nature to keep the crust extended at a proper wideness, and the foot is fixed as it were in a mould.

"By the pressure from the weight of the body, and resistance from the outer edges of the shoe, the heels are forced together, and retain that shape impressed upon

them, which it is impossible ever afterwards to remove; hence a contraction of the heels, and of course lameness. But farther.

"The heels, as has been observed, being forced together, the crust presses upon the processes of the coffin and extremities of the nut-bone: The frog is confined, and raised so far from the ground, that it cannot have that support upon it which it ought to have: the circulation of the blood is impeded, and a wasting of the frog, and frequently of the whole foot, ensues. Hence proceed all those diseases of the feet, known by the names of *sundered, hoof-bound, narrow-heels, running thrushes, corns, high soles, &c.*

"I have likewise frequently observed, from this compression of the internal parts of the foot, a swelling of the legs immediately above the hoof, attended with great pain and inflammation, with a discharge of thin, ichorous, fetid matter: from which symptoms, it is often concluded, that the horse is in a bad habit of body (or what is termed a *grease falling down*), and must therefore undergo a course of medicine, &c.

"The bad effects of this practice are still more obvious upon the external parts of the hoof. The crust toward the toe, being the only part of the hoof free from compression, enjoys a free circulation of that fluid necessary for its nourishment, and grows broader and longer; from which extraordinary length of toe, the horse stumbles in his going, and cuts his legs. The smaller particles of sand insinuate themselves between the shoe and the heels, which grind them away, and thereby produce lameness. All this is entirely owing to the great spring the heels of the horse must unavoidably have upon the heels of a shoe made in this form.

"This concave shoe in time wears thin at the toe, and, yielding to the pressure made upon it, is forced wider, and of consequence breaks off all that part of the crust on the outside of the nails. Instances of this kind daily occur, insomuch that there hardly remains crust sufficient to fix a shoe upon.

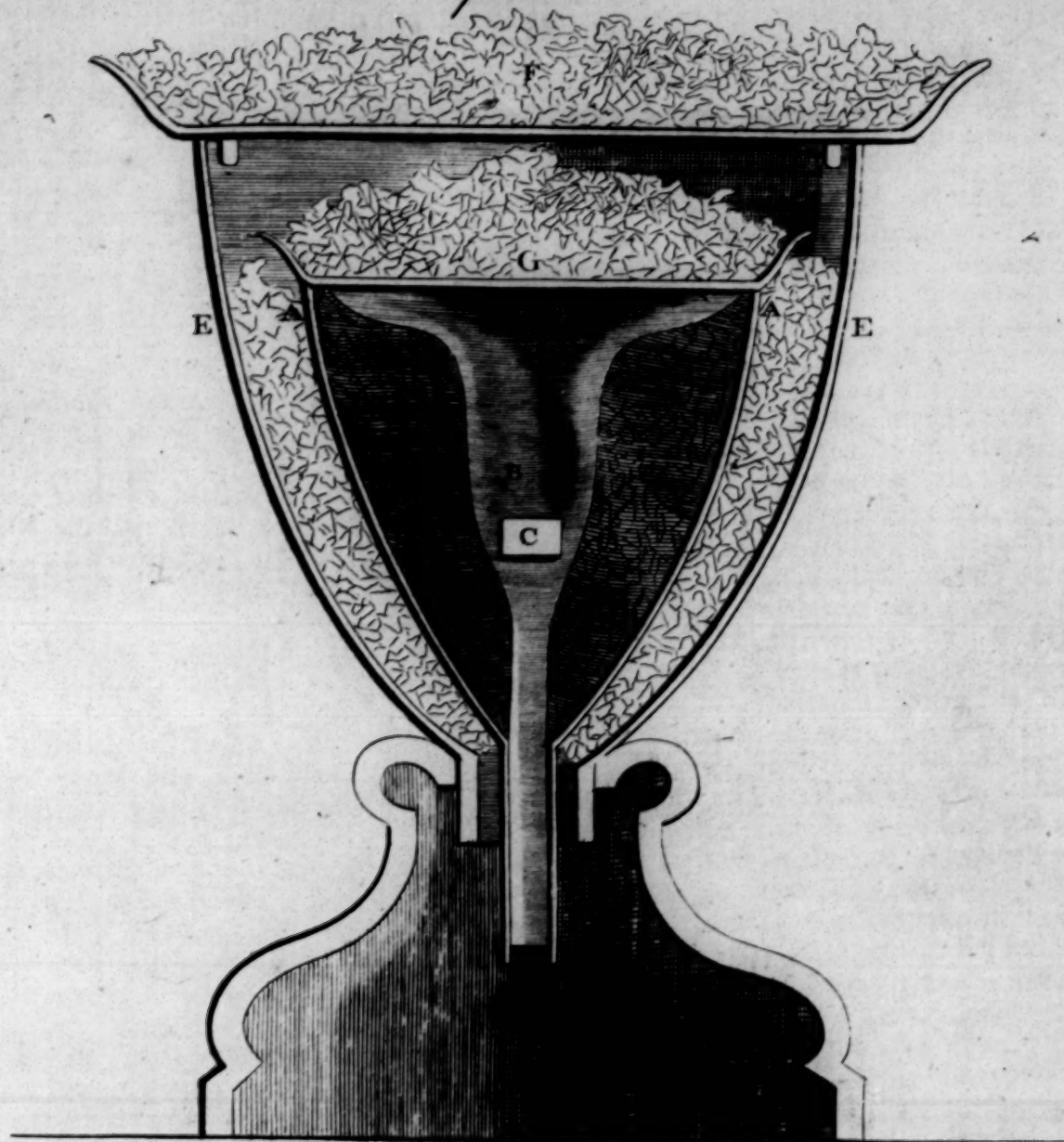
"It is generally thought, that the broader a shoe is, and the more it covers the sole and frog, a horse will travel the better. But, as has been formerly remarked, the broader a shoe is of this form, it must be made the more concave; and, of consequence, the contracting power upon the heels must be the greater. It is likewise to be observed, that, by using strong broad-rimmed concave shoes in the summer-season, when the weather is hot and the roads very dry and hard, if a horse is obliged to ride fast, the shoes, by repeated strokes (or friction) against the ground, acquire a great degree of heat, which is communicated to the internal parts of the foot; and, together with the contraction upon the heels occasioned by the form of the shoe, must certainly cause exquisite pain. This is frequently succeeded by a violent inflammation in the internal parts of the hoof, and is the cause of that disease in the feet so fatal to the very best of our horses, commonly termed a *founder*. This is also the reason why horses, after a journey or a hard ride, are observed to shift their feet so frequently, and to lie down much.

"If we attend further to the convex surface of this shoe, and the convexity of the pavement upon which

* See Plate
CLXXIX.

Evaporation.

Plate CLXXXIX.



FARRIERY,

Horse-Shoes.

Fig. 1.



Fig. 2.



Fig. 3.



Fig. 4.



Fig. 5.





Shoeing. which horses walk, it will then be evident that it is impossible for them to keep their feet from slipping in this form of shoe, especially upon declivities of streets.

"It is also a common practice, especially in this place, to turn up the heels of the shoes into what is called *cramps* or *caulkers*, by which means the weight of the horse is confined to a very narrow surface, viz. the inner round edge of the shoe-rim and the points or caulkers of each heel, which soon wear round and blunt; besides, they for the most part are made by far too thick and long. The consequence is, that it throws the horse forward upon the toes, and is apt to make him slip and stumble. To this cause we must likewise ascribe the frequent and sudden lameness horses are subject to in the legs, by twisting the ligaments of the joints, tendons, &c.

"I do not affirm that caulkers are always hurtful, and ought to be laid aside: On the contrary, I grant, that they, or some such like contrivance, are extremely necessary, and may be used with advantage upon flat shoes where the ground is slippery; but they should be made thinner and sharper than those commonly used, so as to sink into the ground, otherwise they will rather be hurtful than of any advantage.

"The Chinese are said to account a small foot an ornament in their women, and for that purpose, when young, their feet are confined in small shoes. This no doubt produces the desired effect; but must necessarily be very prejudicial to them in walking, and apt to render them entirely lame.

"This practice, however, very much resembles our manner of shoeing horses: for, if we looked upon it as an advantage to them to have long feet, with narrow low heels, and supposing we observed no inconvenience to attend it, or bad consequence to follow it, we could not possibly use a more effectual means to bring it about, than by following the method already described.

"In shoeing a horse, therefore, we should in this, as in every other case, study to follow nature: and certainly that shoe which is made of such a form as to resemble as near as possible the natural tread and shape of the foot, must be preferable to any other.

"But it is extremely difficult to lay down fixed rules with respect to the proper method to be observed in treating the hoofs of different horses: it is equally difficult to lay down any certain rule for determining the precise form to be given their shoes. This will be obvious to every judicious practitioner, from the various constructions of their feet, from disease, and from other causes that may occur; so that a great deal must depend upon the discretion and judgment of the operator, in proportioning the shoe to the foot, by imitating the natural tread, to prevent the hoof from contracting a bad shape.

"In order, therefore, to give some general idea of what may be thought most necessary in this matter, I shall endeavour to describe that form of shoe and method of treating the hoofs of horses, which from experience I have found most beneficial.

VOL. VII.

Shoeing. "Proper Method. It is to be remembered, that a horse's shoe ought by no means to rest upon the sole, otherwise it will occasion lameness; therefore it must rest entirely on the crust: and, in order that we may imitate the natural tread of the foot, the shoe must be made flat (if the height of the sole does not forbid it); it must be of an equal thickness all around the outside of the rim (A); and on the part of it which is to be placed immediately next the foot, a narrow rim or margin is to be formed, not exceeding the breadth of the crust upon which it is to rest, with the nail holes placed exactly in the middle; and from this narrow rim the shoe is to be made gradually thinner towards its inner edge. See fig. 5.

"The breadth of the shoe is to be regulated by the size of the foot, and the work to which the horse is accustomed: but, in general, it should be made rather broad at the toe, and narrow towards the extremity of each heel, in order to let the frog rest with freedom upon the ground. The necessity of this has been already shown.

"The shoe being thus formed and shaped like the foot, the surface of the crust is to be made smooth, and the shoe fixed on with eight or at most ten nails, the heads of which should be sunk into the holes, so as to be equal with the surface of the shoe. The sole, frog, and bars, as I have already observed, should never be pared, farther than taking off what is ragged from the frog, any excrescences or inequalities from the sole. And it is very properly remarked by Mr. Osmer, 'That the shoe should be made so as to stand a little wider at the extremity of each heel than the foot itself: otherwise, as the foot grows in length, the heel of the shoe in a short time gets within the heel of the horse: which pressure often breaks the crust, and produces a temporary lameness, perhaps a corn.'

"This method of shoeing horses I have followed long before Mr. Osmer's treatise on that subject was published; and for these several years past I have endeavoured to introduce it into practice.

"But so much are farriers, grooms &c. prejudiced in favor of the common method of shoeing and paring out the feet, that it is with difficulty they can even be prevailed upon to make a proper trial of it.

"They cannot be satisfied unless the frog be finely shaped, the sole pared, and the bars cut out, in order to make the heels appear wide (B). This practice gives them a show of wideness for the time; yet that, together with the concave form of the shoe, forwards the contraction of the heels, which, when confirmed, renders the animal lame for life.

"In this flat form of shoe, its thickest part is upon the outside of the rim, where it is most exposed to be worn; and being made gradually thinner towards its inner edge, it is therefore much lighter than the common concave shoe; yet it will last equally as long, and with more advantage to the hoof; and as the frog or heel is allowed to rest upon the ground, the foot enjoys the same points of support as in its natural state. It must therefore be much easier for the horse in his

Y

way

(A) For a draught horse about half an inch thick, and larger in proportion for a saddle-horse.
(B) Wide open heels are looked upon as a mark of a sound good hoof.

Shoeing. way of going, and be a means of making him surer-footed. It is likewise evident, that, from this shoe, the hoof cannot acquire any bad form; when, at the same time, it receives every advantage that possibly could be expected from shoeing. In this respect it may very properly be said, that we make the shoe to the foot, and not the foot to the shoe, as is but too much the case in the concave shoes, where the foot very much resembles that of a cat's fixed in a walnut-shell.

"It is to be observed, that the hoofs of young horses, before they are shod, for the most part are wide and open at the heels, and that the crust is sufficiently thick and strong to admit of the nails being fixed very near the extremities of each. But, as I have formerly remarked, from the constant use of concave shoes, the crust of this part of the foot grows thinner and weaker; and when the nails are fixed too far back, especially upon the inside, the horse becomes lame: to avoid this, they are placed more towards the fore-part of the hoof. This causes the heels of the horse to have the greater spring upon the heels of the shoe, which is so very detrimental as to occasion lameness; whereas, by using this flat form of shoe, all these inconveniences are avoided; and if the hoofs of young horses, from the first time that they were shod, were continued to be constantly treated according to the method here recommended, the heels would always retain their natural strength and shape.

"By following this flat method of shoeing, and manner of treating the hoofs, several horses now under my care, that were formerly tender-footed, and frequently lame, while shod with broad concave shoes, are now quite sound, and their hoofs in as good condition as when the first shoes were put upon them: In particular, the horse that wore the broad concave shoes, from which the drawings of fig. 2. and 3. were taken, now goes perfectly sound in the open narrow kind of shoes, as represented fig. 4. 5.

"If farriers considered attentively the design of shoeing horses, and would take pains to make themselves acquainted with the anatomical structure of the foot, they would then be convinced, that this method of treating the hoofs, and this form of shoe is preferable to that which is so generally practised.

"It has been alledged, that in this form of shoe horses do not go so well as in that commonly used. This objection will easily be laid aside, by attending to the following particulars. There are but few practitioners that can or will endeavour to make this sort of shoe as it ought to be. The iron, in forming it, does not so easily turn into the circular shape necessary as in the common shoe; and perhaps this is the principal reason why farriers object to it, especially where they work much by the piece. And as many horses that are commonly shod with concave shoes have their soles considerable higher than the crust, if the shoe is not properly formed, or if it is made too flat, it must unavoidably rest upon the sole, and occasion lameness.

"The practice of paring the sole and frog is also so prevalent, and thought so absolutely necessary, that it is indiscriminately practised, even to excess, on all kinds of feet: and while this method continues to be followed, it cannot be expected that horses can go

upon hard ground (on this open shoe) with that freedom they would do if their soles and frogs were allowed to remain in their full natural strength.

"Experience teaches us, that, in very thin-soled shoes, we feel an acute pain from every sharp pointed stone we happen to tread upon. Horses are sensible of the same thing in their feet, when their soles, &c. are pared too thin. Hence they who are prejudiced against this method, without ever reflecting upon the thin state of the sole, &c. are apt to condemn it, and draw their conclusions more from outward appearances than from any reasoning or knowledge of the structure of the parts. From a due attention likewise to the structure of a horse's foot in a natural state, it will be obvious, that paring away the sole, frog, &c. must be hurtful, and in reality is destroying that substance provided by nature for the defence of the internal parts of the foot: From such practice it must be more liable to accidents from hard bodies, such as sharp stones, nails, glass, &c. From this consideration we will likewise find, that a narrow piece of iron adapted to the shape and size of the foot, is the only thing necessary to protect the crust from breaking or wearing away; the sole, &c. requiring no defence if never pared.

"There is one observation I would farther make, which is, that the shoe should be made of good iron, well worked, or what smiths call *hammer-hardened*, that is, beat all over lightly with a hammer when almost cold. The Spaniards and Portuguese farriers use this practice greatly, insomuch that many people, who have seen them at work, have reported that they form their horses shoes without heating them in the fire as we do. It is well known, that heating of iron till it is red softens it greatly; and when shoes thus softened are put upon horses feet, they wear away like lead. But when the shoes are well hammered, the iron becomes more compact, firm, and hard; so that a well-hammered shoe, though made considerably lighter, yet will last as long as one that is made heavier, the advantage of which is obvious, as the horse will move his feet with more activity, and be in less danger of cutting his legs.

"The common concave shoes are very faulty in this respect; for, in fitting or shaping them to the foot, they require to be frequently heated, in order to make them bend to the unequal surface which the hoof acquires from the constant use of these shoes: they thereby become soft; and to attempt to harden them by beating or hammering when they are shaped to the foot would undo the whole. But flat shoes, by making them, when heated, a little narrower than the foot, will, by means of hammering, become wider, and acquire a degree of elasticity and firmness which it is necessary they should have, but impossible to be given them by any other means whatever; so that any farrier, from practice, will soon be able to judge, from the quality of the iron, how much a shoe, in fitting it to the circumference of the hoof, will stretch by hammering when it is almost cold: this operation, in fitting flat shoes, will be the less difficult, especially when it is considered, that as there are no inequalities on the surface of the hoof (or at least ought not to be) which require to be bended thereto, shoes of this kind only require to be made smooth and flat; hence

Shoeing.

Shoeing.

hence they will press equally upon the circumference or crust of the hoof, which is the natural tread of a horse."

When the roads, &c. are covered with ice, it becomes necessary to have the heels of the shoes turned up, and frequently sharpened, in order to prevent horses from slipping and falling. As this cannot be done without the frequent moving of the shoes, which breaks and destroys the crust of the hoofs where the nails are drove, to prevent this, it is recommended to those who are willing to be at the expence, to have steel points screwed into the heels or quarters of each shoe, which might be taken out and put in occasionally.

The method of doing this properly, as directed by Mr Clark, is first to have the shoes fitted to the shape of the hoof, then to make a small round hole in the extremity of each heel or in the quarters, about three-eighths of an inch in diameter, or more, in proportion to the breadth and size of the shoe; in each of these holes a screw is to be made; the steel points are likewise to have a screw on them, exactly fitted to that in the shoes. Care must be taken that the screw on the points is no longer, when they are screwed into the shoe, than the thickness of the latter. The steel points are to be made sharp; they may either be made square, triangular, or chissel pointed, as may be most agreeable; the height of the point above the shoe should not exceed half an inch for a saddle-horse; they may

be made higher for a draught horse. The key or handle that is necessary to screw them in and out occasionally, is made in the shape of the capital letter T, and of a sufficient size and strength; at the bottom of the handle, a socket or cavity must be made, properly adapted to the shape of the steel point, and so deep as to receive the whole head of the point that is above the shoe. In order to prevent the screw from breaking at the neck, it will be necessary to make it of a gradual taper; the same is likewise to be observed of the female screw that receives it, that is, the hole must be wider on the upper part of the shoe than the under part; the sharp points may be tempered or hardened, in order to prevent them from growing too soon blunt; but when they become blunt, they may be sharpened as at first. These points should be unscrewed when the horse is put into the stable, as the stones will do them more injury in a few minutes than a days riding on ice. A draught horse should have one point on each shoe, as that gives them firmer footing in drawing on ice; but for a saddle horse, when they are put there, they are apt to make him trip and stumble.

When the shoes are provided with these points, a horse will travel on ice with the greatest security and steadiness, much more so than on causeway or turnpike roads, as the weight of the horse presses them down in the ice at every step he makes.

Shoeing.

F A S

Farthing,
Fasces.

FARTHING, a small English copper coin, amounting to one-fourth of a penny. It was anciently called *fourthing*, as being the fourth of the integer or penny.

FARTHING of Gold, a coin used in ancient times, containing in value the fourth part of a noble, or 20d. silver. It is mentioned in the Stat. 9 Hen. V. cap. 7. where it is enacted, that there shall be good and just weight of the noble, half noble, and farthing of gold.

FARTHING of Land seems to differ from *FARDING-deal*. For in a survey-book of the manor of West-Hampton in Devonshire, there is an entry thus: A. B. holds six farthings of land at 126l. *per ann.* So that the farthing of land must have been a considerable quantity, far more than a rood.

FASCES, in Roman antiquity, axes tied up together with rods, or staves, and borne before the Roman magistrates as a badge of their office and authority.

According to Florus, the use of the fasces was introduced by the elder Tarquin the fifth king of Rome; and were then the mark of the sovereign dignity. In after-times they were borne before the consuls, but by turns only, each his day; they had each of them 12, borne by as many lictors. These fasces consisted of branches of elm; having in the middle a securis or axe, the head of which stood out beyond the rest. Publicola took the axe out of the fasces, as Plutarch assures us, to remove from the people all occasion of terror. After the consuls, the pretors assumed the fasces. In the government of the decemvirs, it was the practice at first for only one of them to have the fasces. After-

F A S

wards each of them had twelve, after the manner of the kings.

When the magistrates who by right had the axes carried before them, had a mind to show some deference to the people, or some person of singular merit, they either sent away the lictors, or commanded them to lower the fasces before them, which was called *submittere fasces*. Many instances of this occur in Roman history.

FASCETS, in the art of making glass, are the irons thrust into the mouths of bottles, in order to convey them to the annealing tower.

FASCIA, in antiquity, a thin sash which the Roman women wrapped round their bodies, next to the skin, in order to make them slender. Something of this sort seems also to have been in use amongst the Grecian ladies, if we can depend upon the representation given by Terence, Eun. Act. 2. Sc. 4.

*Haud similis est virginum nostrarum, quas matres student
Demissis humeris esse---vincto corpore, ut graciles fiant.*

FASCIA, in architecture, signifies any flat member having a considerable breadth, and but a small projection, as the band of an architrave, larmier, &c. In brick buildings, the juttings out of the bricks beyond the windows in the several stories except the highest, are called *fascias*, or *fasciæ*.

FASCIA Lata, in anatomy, a muscle of the leg, called also *femi-membranosus*. See ANATOMY, *Table of the Muscles*.

FASCIÆ, in astronomy, the belts seen on the disk of the superior planets Mars, Jupiter, and Saturn. See ASTRONOMY *passim*.

Fascets,
Fasciæ.

Fascialis
Fashion-
pieces.

FASCIALIS, in anatomy, one of the muscles of the thigh, called *sartorius*. See ANATOMY, *Table of the Muscles*.

FASCINATION (from the Greek *βασανισμός*, to fascinate or bewitch), a sort of witchcraft supposed to operate either by the eye or the tongue.

Ancient writers distinguish two sorts of fascination, one performed by looking, or the efficacy of the eye. Such is that spoken of by Virgil in his third eclogue :

Nescio quis teneros oculos mihi fascinat agnos.

The second by words, and especially malignant praises. Such is that mentioned by the same poet in his seventh eclogue :

*Aud, si ultra placitum laudarit, baccare frontem
Gingite, ne vati noceat mala lingua futura.*

Horace touches on both kinds in his first book of epistles :

*Non istis obliquis oculo mea commoda quisquam
Limat, non edis obscuro, morsaque venenat.*

FASCINES, in fortification, faggots of small wood, of about a foot diameter, and six feet long, bound in the middle, and at both ends. They are used in raising batteries, making chandeliers, in filling up the moat to facilitate the passage to the wall, in binding the ramparts where the earth is bad, and in making parapets of trenches to screen the men. Some of them are dipped in melted pitch or tar ; and, being set on fire, serve to burn the enemy's lodgments or other works.

In the corrupt Latin they use *facennia*, *fascennia*, and *fascinata*, &c. to signify the pales, fascines, &c. used to inclose the ancient castles, &c.

FASCIOLA, in zoology, the **FLUKE** or **GOURD WORM** : A genus of insects of the order of vermes intestina ; of which the characters are these : The body is flattish, and has a vent hole at the extremity and on the belly. There are several species. 1. The hepatica, or liverfluke, grows to two thirds of an inch in length, though it is more usually met with not half that size ; and its breadth is nearly equal to two thirds of its length ; it is flattish, but somewhat rounded on the back, and has about eight deep longitudinal furrows in two series ; its skin is soft and whitish, with a tinge of brown. The hinder part is rounded, the fore part is furnished with a large mouth ; it bears some resemblance to the seed of the common gourd, whence it has acquired the name of the *gourd worm*. It is found in fresh waters, in ditches, at the roots of stones, sometimes in the intestines, and often in the substance of the other viscera in quadrupeds. It often infests the liver of sheep, and on that account is called *hepatica*. Bags with salt in them should be placed in the fold that the sheep might lick them, which is the only remedy. 2. The intestinalis, or Intestinal Fluke, is of a long slender form, if extended ; when contracted, of a suboval form. Inhabits the intestines of fresh-water fish ; often found in breams. 3. The barbata is white, with transverse papillæ in the mouth. It is of an oblong shape, and about the size of a cucumber-seed. It is found in the intestines of the sepia lotigo.

FASHION-PIECES, in the sea-language, the aftmost or hindmost timbers of a ship, which terminate the breadth, and form the shape of the stern. They are united to the stern-post, and to the extremity of the

wing-transom, by a rabbit, and a number of strong nails or spikes driven from without.

FAST, in general, denotes the abstinence from food, (see **FASTING**) ; but is more particularly used for such abstinence on a religious account.

Religious fasting has been practised by most nations from the remotest antiquity. Some divines even pretend its origin in the earthly paradise, where our first parents were forbidden to eat of the tree of knowledge. But though this seems carrying the matter too far, it is certain, that the Jewish church has observed fasts ever since its first institution. Nor were the neighbouring heathens, viz. the Egyptians, Phœnicians, and Assyrians, without their fasts. The Egyptians, according to Herodotus, sacrificed a cow to Isis, after having prepared themselves by fasting and prayer : a custom which he likewise ascribes to the women of Cyrene. Porphyry affirms, that the Egyptians, before their stated sacrifices, always fasted a great many days, sometimes for six weeks ; and that the least behoved to be for seven days : during all which time the priests and devotees, not only abstained from flesh, fish, wine, and oil ; but even from bread, and some kinds of pulse. These austerities were communicated by them to the Greeks, who observed their fasts much in the same manner. The Athenians had the Eleusinian and Thesmophorian fasts, the observation of which was very rigorous, especially among the women, who spent one whole day sitting on the ground in a mournful dress, without taking any nourishment. In the island of Crete, the priests of Jupiter were obliged to abstain all their lives from fish, flesh, and baked meats. Apulicus informs us, that whoever had a mind to be initiated in the mysteries of Cybele, were obliged to prepare themselves by fasting ten days ; and, in short, all the pagan dieties, whether male or female, required this duty of those that desired to be initiated into their mysteries, of their priests and priestesses that gave the oracles, and of those that came to consult them.

Among the heathens fasting was also practised before some of their military enterprises. Aristotle informs us, that the Lacedæmonians having resolved to succour a city of the allies, ordained a fast throughout the whole extent of their dominions, without excepting even the domestic animals : and this they did for two ends ; one to spare provisions in favour of the besieged, the other to draw down the blessing of heaven upon their enterprise. The inhabitants of Tarentum, when besieged by the Romans, demanded succours from their neighbours of Rhegium, who immediately commanded a fast throughout their whole territories. Their enterprise having had good success by their throwing a supply of provisions into the town, the Romans were obliged to raise the siege ; and the Tarentines, in memory of this deliverance, instituted a perpetual fast.

Fasting has always been reckoned a particular duty among philosophers and religious people, some of whom have carried their abstinence to an incredible length. At Rome it was practised by kings and emperors themselves. Numa Pompilius, Julius Cæsar, Augustus, Vespasian, and others, we are told, had their stated fast-days : and Julian the apostate was so exact in this observance as to outdo the priests themselves, and even the most rigid philosophers. The Pythagoreans kept a continual

Fast.

White Headed Eagle.

F A L C O.

Plate CXC.



Swallow Tailed Hawk.



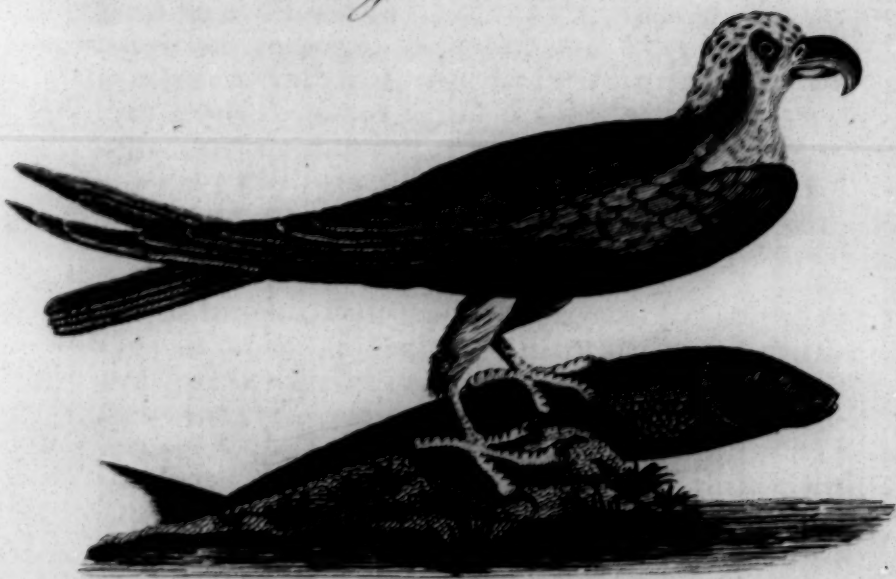
Pigeon Hawk.



Iceland Falcon.



Fishing Hawk.



Trenchard sculp.

1000 1000

1000 1000



Fast.

continual lent; but with this difference, that they believed the use of fish to be equally unlawful with that of flesh. Besides their constant temperance, they also frequently fasted rigidly for a very long time. In this respect, however, they were all outdone by their master Pythagoras, who continued his fasts for no less than 40 days together. Even Apollonius Tyaneus, one of his most famous disciples, could never come up to him in the length of his fasts, though they greatly exceeded those of the ordinary Pythagoreans. The gymnosophists, or brachmans of the east, are also very remarkable for their severe fastings; and the Chinese, according to father le Comte, having also their stated fasts, with forms of prayer for preserving them from barrenness, inundations, earthquakes, &c. The Mahometans too, who possess so large a part of Asia, are very remarkable for the strict observance of their fasts; and the exactness of their dervises in this respect is extraordinary.

Fasting was often used by the heathens for superstitious purposes; sometimes to procure the interpretations of dreams; at others, to be an antidote against their pernicious consequences. A piece of superstition prevails to this day among the Jews; who, though expressly forbidden to fast on Sabbath days, think themselves at liberty to dispense with this duty when they happen to have frightful and unlucky dreams the night preceding, that threatened them with great misfortunes. On these occasions they observe a formal fast the whole day; and at night the patient, having invited three of his friends, addresses himself to them seven times in a very solemn manner, saying, "May the dream I have had prove a lucky one!" And his friends answer as many times, "Amen, may it be lucky, and God make it so!" After which, in order to encourage him, they conclude the ceremony with these words of Ecclesiastes, "Go eat thy bread with joy;" and then set themselves down to table. They have also added several fasts not commanded in the law of Moses, particularly three, in memory of sore distresses their nation has suffered at different times. The abstinence of the ancient Jews commonly lasted 27 or 28 hours at a time; beginning before sunset, and not ending till some hours after sunset next day. On these days they were obliged to wear white robes in token of grief and repentance; to cover themselves with sackcloth, or their worst clothes: to lie on ashes: to sprinkle them on their head, &c. Some spent the whole night and day following in the temple or synagogue, in prayers and other devotions, barefooted, with a scourge in their hands, of which they sometimes made a good use in order to raise their zeal. Lastly, in order to complete their abstinence, at night they were to eat nothing but a little bread dipped in water, with some salt for seasoning; except they chose to add to their repast some bitter herbs and pulse.

The ancients, both Jews and Pagans, had also their fasts for purifying the body, particularly the priests and such as were any way employed at the altars; for when nocturnal disorders happened to these, it was unlawful for them to approach all the next day, which they were bound to employ in purifying themselves. On this account, at great festivals, where their ministry could not be dispensed with, it was usual for them, on

the eve thereof, not only to fast, but also to abstain from sleep, for the greater certainty. For this purpose the high-priest had under-officers to wake him, if overtaken with sleep; against which other preservatives were also made use of.

FASTERMANS or FASTING-MEN, q. d. *homines habentes*, was used in ancient customs for men in repute and substance; or rather for pledges, sureties, or bondsmen, who, according to the Saxon polity, were fast bound to answer for one another's peaceable behaviour.

FASTI, in Roman antiquity, the kalender wherein were expressed the several days of the year, with their feasts, games, and other ceremonies.

There were two sorts of fasti, the greater and less; the former being distinguished by the appellation *fasti magistrates*, and the latter by that of *fasti kalendares*.

1. The *Fasti Kalendares*, which were what was properly and primarily called *fasti*, are defined by Festus Pompeius to be books containing a description of the whole year: i. e. Ephemerides, or diaries, distinguishing the several kinds of days, *festi*, *profesti*; *fasti*, *nefasti*, &c. The author hereof was Numa, who committed the care and direction of the fasti to the pontifex maximus, whom the people used to go and consult on every occasion. This custom held till the year of Rome 450, when C. Flavius, secretary to the pontifices, exposed in the forum a list of all the days whereon it was lawful to work; which was so acceptable to the people, that they made him curule ædile.

These lesser fasti or fasti kalendares, were of two kinds, *urbani* and *rustici*.

The *fasti urbani*, or fasti of the city, were those which obtained or were observed in the city. Some will have them thus called because they were exposed publicly in divers parts of the city; though, by the various inscriptions or gravings thereof on antique stones, one would imagine that private persons had them likewise in their houses. Ovid undertook to illustrate these fasti urbani, and comment on them, in his *Libri Fastorum*, whereof we have the six first books still remaining; the six last, if ever they were written, being lost.

In the *fasti rustici*, or country fasti, were expressed the several days, feasts, &c. to be observed by the country people: for as these were taken up in tilling the ground, fewer feasts, sacrifices, ceremonies, and holidays, were enjoined them than the inhabitants of cities; and they had also some peculiar ones not observed at Rome. These rustic fasti contained little more than the ceremonies of the calends, nones, and ides: the fairs, signs of the zodiac, increase and decrease of the days, the tutelary gods of each month, and certain directions for rural works to be performed each month.

2. In the greater fasti, or *Fasti Magistrates*, were expressed the several feasts, with every thing relating to the gods, religion, and the magistrates; the emperors, their birth-days, offices, days consecrated to them, and feasts and ceremonies established in their honour, or for their prosperity, &c. With a number of such circumstances did flattery at length swell the fasti; when they became denominated *Magni* to distinguish them from the bare kalender, or fasti kalendares.

FASTI was also a chronicle or register of time, wherein

Fastermans, Fasti.

Fasti,
Fasting.

in the several years were denoted by the respective consuls, with the principal events that happened during their consulates; these were called also *fasti consulares*, or *consular fasti*.

FASTI, or *Lies Fasti* also denoted court-days. The word *fasti fastorum*, is formed of the verb *fari*, "to speak," because during those days the courts were opened, causes might be heard and the prætor was allowed *fari*, to pronounce the three words, *do, dico, addico*: The other days wherein this was prohibited were called *nefasti*: thus Ovid,

Ille nefastus erit, per quem tria verba silentur:
Fastus erit, per quem lege licebit agi.

These *dies fasti* were noted in the kalender by the letter *F*: but observe, that there were some days *ex parte fasti*, partly *fasti*, partly *nefasti*; i. e. justice might be distributed at certain times of the day, and not at others. These days were called *intercisi*, and were marked in the kalender thus: *F. P. fastos primo*, where justice might be demanded during the first part of that day.

FASTING, the abstaining from food. See *FAST*.

Many wonderful stories have been told of extraordinary fasting; great numbers of which undoubtedly must be false. Others, however, we have on very good authority, of which some are mentioned under the article *ABSTINENCE*. Another we have in the

FASTING Woman. A full account of this very uncommon case is given in the *Phil. Trans.* Vol. LXVII. Part I. the substance of which follows: The woman, whose name was *Janet McLeod*, an inhabitant in the parish of Kincardine in Rosshire, continued healthy till she was 15 years of age, when she had a pretty severe epileptic fit; after this she had an interval of health for four years, and then another epileptic fit which continued a whole day and a night. A few days afterwards she was seized with a fever, which continued with violence several weeks, and from which she did not perfectly recover for some months. At this time she lost the use of her eye-lids; so that she was under a necessity of keeping them open with the fingers of one hand, whenever she wanted to look about her. In other respects she continued in pretty good health; only she never had any appearance of menses, but periodically spit up blood in pretty large quantities, and at the same time it flowed from the nose. This discharge continued several years; but at last it ceased: and soon after she had a third epileptic fit, and after that a fever from which she recovered very slowly. Six weeks after the crisis, she stole out of the house unknown to her parents, who were busied in their harvest work, and bound the sheaves of a ridge before she was observed. In the evening she took to her bed, complaining much of her *heart* (most probably her *stomach*, according to the phraseology of that country) and her head. From that time she never rose for five years, but was occasionally lifted out of bed. She seldom spoke a word, and took so little food that it seemed scarce sufficient to support a sucking infant. Even this small quantity was taken by compulsion; and at last, about Whitsunday 1763, she totally refused every kind of food or drink. Her jaw now became so fast locked, that it was with the greatest difficulty her father was able to open her teeth a little, in order to admit a small quantity of gruel or whey; but of this so much generally run out at the corners of her mouth,

Fasting.

that they could not be sensible any had been swallowed. About this time they got some water from a noted medicinal spring in Brae-Mar, some of which they attempted to make her swallow, but without effect. They continued their trials, however, for three mornings; rubbing her throat with the water, which run out at the corners of her mouth. On the third morning during the operation, she cried out, "Give me more water; and swallowed with ease all that remained in the bottle. She spoke no more intelligibly for a year; though she continued to mutter some words which her parents only understood, for 14 days. She continued to reject all kinds of food and drink till July 1765. At this time her sister thought, by some signs she made, that she wanted her jaws opened; and this being done, not without violence, she called intelligibly for a drink, and drank with ease about an English pint of water. Her father then asked her why she would not make some signs when she wanted a drink to which she answered, why should she when she had no desire. It was now supposed that she had regained the faculty of speech; and her jaws were kept open for about three weeks by means of a wedge. But in four or five days she became totally silent, and the wedge was removed because it made her lips sore. She still, however, continued sensible; and when her eye-lids were opened, knew every body, as could be guessed from the signs she made.

By continuing their attempts to force open her jaws, two of the under foreteeth were driven out; and of this opening her parents endeavoured to avail themselves by putting some thin nourishing drink into her mouth; but without effect, as it always returned by the corners. Sometimes they thought of thrusting a little dough of oatmeal through this gap of the teeth, which she would retain a few seconds, and then return with something like a straining to vomit, without one particle going down. Nor were the family sensible of any thing like swallowing for four years, excepting the small draught of Brae-Mar water and the English pint of common water. For the last three years she had not any evacuation by stool or urine, except that once or twice a-week she passed a few drops of urine, about as much, to use the expression of her parents, as would wet the surface of a halfpenny. In this situation she was visited by Dr Mackenzie, who communicated the account of her case to the Royal Society. He found her not at all emaciated: her knees were bent and the hamstrings tight, so that her heels almost touched her buttocks. She slept much, and was very quiet: but when awake, kept a constant whimpering like a newborn weakly infant. She never could remain a moment on her back, but always fell to one side or another; and her chin was clapped close, to her breast, nor could it by any force be moved backwards.

The doctor paid his first visit in the month of October; and five years afterwards, viz. in October 1772, was induced to pay her a second visit, by hearing that she was recovering, and had begun to eat and drink. The account given him was most extraordinary. Her parents one day returning from their country labours (having left their daughter fixed to her bed as usual), were greatly surprised to find her sitting upon her hams, on the side of the house opposite to her bed-place, spinning with her mother's distaff. All the food she took

at

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at that time was only to crumble a little oat or barley cake in the palm of her hand, as if to feed a chicken. She put little crumbs of this into the gap of her teeth; rolled them about for some time in her mouth; and then sucked out of the palm of her hand a little water, whey, or milk; and this only once or twice a-day, and even that by compulsion. She never attempted to speak; her jaws were fast locked, and her eyes shut. On opening her eye-lids, the balls were found to be turned up under the edge of the os frontis; her countenance was ghastly, her complexion pale, and her whole person emaciated. She seemed sensible, and tractable in every thing except in taking food. This she did with the utmost reluctance, and even cried before she yielded. The great change of her looks Dr Mackenzie attributed to her spinning flax on the distaff, which exhausted too much of the saliva; and therefore he recommended to her parents to confine her totally to the spinning of wool. In 1775, she was visited again, and found to be greatly improved in her looks as well as strength; her food was also considerably increased in quantity; though even then she did not take more than would be sufficient to sustain an infant of two years of age.

The following remarkable instances of animals being able to live long without food, are related by Sir William Hamilton in his account of the late earthquakes in Italy, (*Phil. Transf.* vol. 73.) "At Soriano (says he), two fattened hogs that had remained buried under a heap of ruins, were taken out alive the 42d day; they were lean and weak, but soon recovered." Again, "At Messina two mules belonging to the Duke de Belviso remained under a heap of ruins, one of them 22 days, and the other 23 days; they would not eat for some days, but drank water plentifully, and are now recovered. There are numberless instances of dogs remaining many days in the same situation; and a hen belonging to the British vice-consul at Messina, that had been closely shut up under the ruins of his house, was taken out the 22d day, and is now recovered; it did not eat for some days, but drank freely; it was emaciated, and showed little signs of life at first. From these instances, and those related before of the hogs at Soriano, and several others of the same kind that have been related to me, but which being less remarkable I omit, one may conclude, that long fasting is always attended with great thirst and total loss of appetite."

An instance of a similar kind, not less remarkable than either of the two preceding, we find in the Gentleman's Magazine for Jan. 1785, communicated by a correspondent, as follows: "During the heavy snow which fell in the night of the 7th of January 1776, a parcel of sheep belonging to Mr John Wolley, of Matlock, in Derbyshire, which were pastured on that part of the East Moor that lies within the manor of Matlock, were covered with the drifted snow: in the course of a day or two all the sheep that were covered with the snow were found again, except two, which were consequently given up as lost; but on the 14th of February following (some time after the break of the snow in the valleys, and 38 days after the fall), as a servant was walking over a large parcel of drifted snow which remained on the declivity of a hill, a dog he had with him discovered one of the two sheep that

had been lost, by winding (or scenting) it through a small aperture which the breath of the sheep had made in the snow; the servant thereupon dug away the snow, and released the captive from its prison; it immediately ran to a neighbouring spring, at which it drank for a considerable time, and afterwards rejoined its old companions as though no such accident had befallen it. On inspecting the place where it was found, it appeared to have stood between two large stones which lay parallel with each other at about two feet and an half distance, and probably were the means of protecting it from the great weight of the snow, which in that place lay several yards thick; from the number of stones around it, it did not appear that the sheep had been able to pick up any food during its confinement. Soon afterwards its owner removed it to some low lands; but as it had nearly lost its appetite, it was fed with bread and milk for some time: in about a fortnight after its enlargement it lost its sight and wool; but in a few weeks afterwards they both returned again, and in the course of the following summer it was quite recovered. The remaining sheep was found dead about a week after the discovery of the other."

In the same publication † is recorded the death of one Caleb Elliot, a visionary enthusiast, who meant to have fasted 40 days, and actually survived 16 without food, having obstinately refused sustenance of every kind.

FASTOLF (Sir John), a valiant and renowned English officer, a knight-bannere and of the garter, who served in France under Henry IV. V. and VI. was descended from an ancient family in Norfolk, and was born about the year 1377. He was as much distinguished for his virtue at home as for his valour abroad; and became no less amiable in his private, than he had been admirable in his public character. He died in 1459, upwards of 80 years of age, as we learn from his noted cotemporary William Caxton the first English printer. By an unaccountable mistake it has been asserted, that Shakespear's Falstaff was drawn to ridicule this great man; and this has made judicious biographers more studious to preserve his reputation.

FAT, an oily concrete substance deposited in different parts of animal bodies. See ANATOMY, n° 83.

Strong exercise, preternatural heat, an acrimonious state of the juices, and other like causes, by which the oily parts of the blood are attenuated, resolved, or evacuated, prevent the generation of fat; labours of the mind also have this effect, as well as labour or intemperance of the body. Hence rest and plentiful food are sufficient to fatten brutes; but with men it is often otherwise. It is surprising how soon some birds grow fat; ortolons in 24 hours, and larks still sooner.

Fats may be divided, from their consistence, into three kinds: (1.) The soft and thin, which grow perfectly liquid in a very small heat; (2.) The thick and consistent, which liquify less readily; and, (3.) The hard and firm, which require a still stronger heat to melt them. The first is called *Pinguedo*; the second, *Auxungia*; and the third, *Adeps*, as taken from the animal; and *Sebum*, or *Sevum*, when freed from the skins, &c. This use of the names, however, is not constant, some employing them differently.

A great number of fats have been kept in the shops, for

Fasting

Fat.

† Suppl. for
1789, O-
bituary,
p. 1211.

Fat.

for making ointments, plasters, and other medicinal compositions; as hog's lard, the fat of the boar, the fox, the hair, dog, wild cat, Alpine mouse, beaver; that of hens, ducks, geese, storks; of the whale, pike, serpents, viper, &c. as also human fat. In regard to all these kind of substances, however, much depends upon the manner of purifying or trying, and of keeping them.

To obtain fat pure, it must be cut into pieces, and cleaned from the interposed membranes and vessels. It must then be cleansed from its gelatinous matter by washing with water, till the water comes from it colourless and insipid; it is afterwards to be melted with a moderate heat in a proper vessel with a little water; and it is to be kept thus melted till the water be entirely evaporated, which is known by the discontinuance of the boiling, which is caused by the water only, and which lasts till not a drop of it remains: it is afterwards to be put into an earthen pot, where it fixes; then it is exceedingly white, sufficiently pure for the purposes of pharmacy or chemical examination.

Fat thus purified has very little taste, and a weak, but peculiar, smell.

For the analysis, chemical properties, &c. of fat, see CHEMISTRY, n° 1015. and 1428.

One of the chief uses of fat probably is, to receive into its composition, to blunt and correct, a great part of the acids of the aliments, and which are more than are requisite to the composition of the nutritive juice, or which nature could not otherwise expel. This is certain, that the greater the quantity of aliments is taken by healthy animals above what is necessary for their nourishment and reproduction, the fatter they become. Hence animals which are castrated, which are not much exercised, or which are come to an age when the loss and production of the seminal fluid is less, and which at the same time consume much succulent aliment, generally become fatter, and sometimes exceedingly so.

Although fat be very different from truly animalised substances, and appears not easily convertible into nutritive juices, it being generally difficult of digestion, and apt to become rancid, as butter does in the stomachs of many persons; yet in certain cases it serves to the nourishment and reparation of the body. Animals certainly become lean, and live upon their fat, when they have too little food, and when they have diseases which prevent digestion and the production of the nutritive juice; and in these cases the fatter animals hold out longer than the leaner. The fat appears to be then absorbed by the vessels designed for this use, and to be transformed into nutritive juice.

FAT, in the sea-language, signifies the same with broad. Thus a ship is said to have a fat quarter, if the trussing-in or tuck of her quarter be deep.

FAT likewise denotes an uncertain measure of capacity. Thus a fat of isinglass contains from 3½ hundred weight to 4 hundred weight; a fat of unbound books, half a maund or four bales; of wire, from 20 to 25 hundred weight; and of yarn, from 220 to 221 bundles.

FAT, or VAT, is used also for several utensils: as, 1. A great wooden vessel, employed for the measuring of malt, and containing a quarter or eight bushels. 2. A large brewing vessel, used by brewers to run their wort in.

3. A leaden pan or vessel for the making of salt at Droitwich.

Fata.

FATA MORGANA, a very remarkable aerial phenomenon, which is sometimes observed from the harbour of Messina and adjacent places, at a certain height in the atmosphere. The name, which signifies the *Fairy Morgana*, is derived from an opinion of the superstitious Sicilians, that the whole spectacle is produced by fairies, or such like visionary invisible beings. The populace are delighted whenever it appears; and run about the streets shouting for joy, calling every body out to partake of the glorious sight.

This singular meteor has been described by various authors; but the first who mentioned it with any degree of precision was Father Angelucci, whose account is thus quoted by Mr Swinburne in his *Tour through Sicily*: "On the 15th of August 1643, as I stood at my window, I was surprised with a most wonderful delectable vision. The sea that washes the Sicilian shore swelled up, and became, for ten miles in length, like a chain of dark mountains; while the waters near our Calabrian coast grew quite smooth, and in an instant appeared as one clear polished mirror, reclining against the aforesaid ridge. On this glass was depicted, in *chiaro scuro*, a string of several thousands of pilastres, all equal in altitude, distance, and degree of light and shade. In a moment they lost half their height, and bent into arcades, like Roman aqueducts. A long cornice was next formed on the top, and above it rose castles innumerable, all perfectly alike. These soon split into towers, which were shortly after lost in colonnades, then windows, and at last ended in pines, cypresses, and other trees, even and similar. This is the Fata Morgana, which for 26 years I had thought a mere fable."

To produce this pleasing deception, many circumstances must concur, which are not known to exist in any other situation. The spectator must stand with his back to the east, in some elevated place behind the city, that he may command a view of the whole bay; beyond which the mountains of Messina rise like a wall, and darken the back ground of the picture. The winds must be hushed, the surface quite smoothed, the tide at its height, and the waters pressed up by currents to a great elevation in the middle of the channel. All these events coinciding, as soon as the sun surmounts the eastern hills behind Reggio, and rises high enough to form an angle of 45 degrees on the water before the city, every object existing or moving at Reggio will be repeated 1000 fold upon this marine looking-glass; which, by its tremulous motion, is as it were cut into facets. Each image will pass rapidly off in succession as the day advances, and the stream carries down the wave on which it appeared. Thus the parts of this moving picture will vanish in the twinkling of an eye. Sometimes the air is at that moment so impregnated with vapours, and undisturbed by winds, as to reflect objects in a kind of aerial screen, rising about 30 feet above the level of the sea. In cloudy heavy weather, they are drawn on the surface of the water, bordered with fine prismatical colours.

To the above account we shall add the following, given by M. Houel, whose judgment and veracity render his authority highly respectable. "In fine summer days, when the weather is calm, there rises above the great

Fate
Fathemites

great current a vapour, which acquires a certain density, so as to form in the atmosphere horizontal prisms, whose sides are disposed in such a manner, that when they come to their proper degree of perfection, they reflect and represent successively, for some time (like a moveable mirror), the objects on the coast or in the adjacent country. They exhibit by turns the city and suburbs of Messina, trees, animals, men, and mountains. They are certainly beautiful aerial moving pictures. They are sometimes two or three prisms equally perfect; and they continue in this state eight or ten minutes. After this, some shining inequalities are observed upon the surface of the prism, which render confused to the eye the objects which has been before so accurately delineated, and the picture vanishes. The vapour forms other combinations, and is dispersed in air. Different accounts have been given of this singular appearance; which for my part I attribute to a bitumen which issues from certain rocks at the bottom of the sea, and which is often seen to cover a part of its surface in the canal of Messina. The subtle part of the this bitumen being attenuated, combined, and exhaled with the aqueous globules that are raised by the air, and formed into bodies of vapour, give to this condensed vapour more consistence; and contribute by their smooth and polished particles, to the formation of a kind of aerial crystal, which receives the light, reflects it to the eye, and transmits to it all the luminous points which colour the objects exhibited in this phenomenon and render them visible."

FATE, (*fatum*), denotes an inevitable necessity depending upon a superior cause. The word is formed *a fando*, "from speaking:" and primarily implies the same with *effatum*, viz. a word or decree pronounced by God; or a fixed sentence whereby the Deity has prescribed the order of things, and allotted to every person what shall befall him.

The Greeks call it *συναρμωσις*, as it were a chain or necessary series of things indissolubly linked together. It is also used to express a certain unavoidable designation of things, by which all agents, both necessary and voluntary, are swayed and directed to their ends. See NECESSITY.

In this last sense, fate is distinguished into, 1. Astrological fate, arising from the influence and position of the heavenly bodies; which (it is supposed) gave laws both to the elements and mixed bodies, and to the wills of men. 2. Stoical fate, defined by Cicero an order or series of causes, wherein, cause being linked to cause, each produces another, and thus all things flow from one prime cause. To this fate the Stoics subject even the gods.

Fate is divided by later authors into physical and divine. 1. Physical fate is an order and series of natural causes appropriated to their effects. By this fate it is that fire warms, bodies communicate motion to each other, &c. and the effects of it are all the events and phenomena of nature. 2. Divine fate is what is more usually called *Providence*. See PROVIDENCE.

FATES, in mythology. See PARCE.

FATHEMITES, FATEMITES, or FATHIMITES, the descendants of Mahomet by Fathema, or Fatima, his daughter. They never enjoyed the khalifat of Mecca or Bagdad, but reigned in Barbary and Egypt. See the history of these countries.

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FATHER, a term of relation denoting a person who who had begot a child. See PARENT and CHILD.

By the laws of Romulus, a father had an unlimited power over his children. Amongst the Lacedemonians, as we learn from Aristotle's politics, the father of three children was excused from the duty of mounting guard for the security of the city; and a father of four children, was exempted from every public burden, the Poppæan law, amongst the Romans, granted many valuable privileges to the fathers of three children; amongst which one was, that he should be excused from civil offices, and that the mother should have liberty in her father's life-time, to make a will, and manage her estate without the authority of tutors.

Natural FATHER, is he who has illegitimate children. See BASTARD; and Law, N° clxi. 33. clxxxii. 3, 4.

Adoptive FATHER, is he who takes the children of some other, and acknowledges them as his own. See ADOPTION.

Putative FATHER, is he who is only the reputed or supposed father. Joseph was putative father of our Saviour.

FATHER-in-law, is a person married to a woman who has children by a former husband, &c. to which children he is said to be a father-in-law.

FATHER is also used in theology for the first Person in the Trinity.

FATHER is also used in a figurative sense on divers moral and spiritual occasions. Thus, it is applied to the patriarchs; as we say Adam was the father of all mankind, Abraham the father of the faithful, &c.

FATHER, in church-history, is applied to ancient authors who have preserved in their writings the traditions of the church. Thus St Chrysostom, St Basil, &c. are called *Greek fathers*, and St Augustine and St Ambrose *Latin Fathers*. No author who wrote later than the 12th century is dignified with the title of *Father*.

FATHER, is also a title of honour given to prelates and dignitaries of the church, to the superiors of convents, to congregations of ecclesiastics, and to persons venerable for their age or quality. Thus we say, the right reverend father in God, the father-general of the Benedictines, the fathers of the council of Nice, father of his country, &c.

FATHERLASHER, in ichthyology. See COTTUS.

FATHOM, a long measure containing six feet, used chiefly at sea for measuring the length of cables and cordage.

FATNESS. See CORPULENCY.—It is observed that for one fat person in France or Spain, there are an hundred in England and Holland. This is supposed to be from the use of new malt liquors, more than from the difference of climates or degrees of perspiration. Indolence may cause fatness in some few constitutions; but, in general, those who are disposed to this habit will be fat in spite of every endeavour to the contrary, but that of destroying health.

FATUARI, in antiquity, were persons who, appearing inspired, foretold things to come. The word is formed of *Fatua*, wife of the god Faunus, who was supposed to inspire women with the knowledge of futurity, as Faunus himself did the men.—*Fatua* had her name from *fari*, q. d. *vaticinari*, "to prophesy."

FAVISSÆ, in antiquity, were, according to Fes-

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Father
Favissæ

Fauna
||
Favorinus.

tus and Gellius, cisterns to keep water in: but the favissæ in the Capitol at Rome were dry cisterns or subterraneous cellars, where they laid up the old statues, broken vessels, and other things used in the temple. These were much the same with what, in some of the modern churches are called the *archives* and *treasury*.

FAUNA, a deity among the Romans. She was daughter of Picus, and was originally called *Marica*. Her marriage with Faunus procured her the name of *Fauna*, and her knowledge of futurity that of *Fatua* and *Fatidica*. It is said that she never saw a man after her marriage with Faunus, and that her uncommon chastity occasioned her being ranked among the gods after death. She is the same, according to some, as *Bona Mater*.

FAUNALIA, in antiquity, Roman feasts celebrated in honour of the god Faunus, who was the same among the Romans with the *Pan* of the Greeks.

The Faunalia were held on the day of the nones of December; i. e. on the fifth day of that month. The principal sacrifice was a roe-buck; or rather, according to Horace, a kid, attended with libations of wine and burning of incense. It was properly a country festival being performed in the fields and villages with peculiar joy and devotion. Horace gives us a very gay description thereof in the 18th ode of his third book:

*Tener pleno cadit hœdus anno:
Larga nec defunt Veneris sodali
Vina cratera: vetus ara multo
Fumat odore.*

Struvius in his Roman kalendar marks the feast of Faunus on the day of the ides of February, which is the 30th day of that month; and the Faunalia he places on the fifth of the ides of December, on the 9th of that month: and in chap. ix. he shows, that there really were two Faunalia; the one in February, mentioned by Ovid, *Fast. lib. vi. ver. 246*, the other on the 9th of December, mentioned by Horace in the place just cited.

FAUNS, (FAUNI), among the ancients, were a species of demi-gods inhabiting the forests; called also *Sylvans* (*Sylvani*), and little differing from the Satyrs. They delighted more particularly in vineyards; and they generally appear as attendants of Bacchus, in the representations of Bacchanal feasts and processions. They were represented as half men, half goats, having the horns, ears, feet, and tail of a goat, a very flat nose, and the rest human. Though the Fauns were held for demi-gods, yet they were supposed to die after a long life. Arnobius shews that their father or chief, Faunus himself, only lived 120 years.

FAUNUS, (fab. hist.) a son of Picus, who reigned in Italy about 1300 years before the Augustan age. His bravery as well as wisdom, having given rise to the tradition that he was son of Mars. His great popularity, and his fondness for agriculture, made his subjects revere him as one of their country deities after death. He was represented with all the equipage of the satyrs, and was consulted to give oracles.

FAVONIUS, among the Romans, the wind which blew directly from the west.

FAVORINUS, an ancient orator and philosopher of Gaul, who flourished under the emperor Adrian, and taught with high reputation both at Athens and

Rome. Many works are attributed to him; among the rest, a Greek miscellaneous history often quoted by Diogenes Laertius.

FAUSTUS. See FUST.

FAWKES (Francis), an ingenious poet, had his school-education at Leeds; from whence he was transplanted to Jesus-college, Cambridge, where he took the degrees in arts. Entering early into holy orders, he settled himself at Bramham in Yorkshire, near the elegant seat of that name (Mr Lane's), which he celebrated in verse in 1745, in a 4to pamphlet anonymous. His first poetical publications were, *Gawen Douglas's Description of May and Winter modernised*. Removing afterwards to the curacy of Croydon in Surry, he recommended himself to the notice of Archbishop Herring, then resident there on account of his health, to whom besides other pieces he addressed an Ode on his recovery in 1754, printed in Mr Doddsley's Collection. In consequence, his Grace collated him in 1755 to the vicarage of Orpington with St Mary Gray in Kent; and Mr Fawkes lamented his patron's death in 1757 in a pathetic elegy styled *Aurelius*, first printed with his Grace's Seven Sermons, in 1763. He married about the same time Miss Purrier of Leeds. In April 1774, by the late Dr Plumtree's favour, he exchanged his vicarage for the rectory of Hayes. He was also one of the chaplains to the Princess Dowager of Wales. He published a volume of Poems by subscription in 8vo, 1761; the Poetical Kalendar 1763; and Poetical Magazine 1764, in conjunction with Mr Woty; Partridge-shooting, an Eclogue, to the Honourable Cha. York, 1767, 4to; and a Family Bible, with notes, in 4to, a compilation. But his great strength lay in translation, in which, since Pope, few have equalled him. Witness his fragments of Menander (in his Poems); his Works of Anacreon, Sappho, Bion, Moschus, and Musæus, 12mo, 1760; his Idylliums of Theocritus, by subscription, 8vo, 1767; and his Argonautics of Apollonius Rhodius, by subscription also (a posthumous publication, completed by the Reverend Mr Meen of Emanuel College, Cambridge), 8vo, 1780. He died August 26. 1777.

FAWN among sportsmen, a buck or doe of the first year; or the young one of the buck's breed in its first year.

FE, FO, or *Fohi*, the name of the chief god of the Chinese, whom they adore as the sovereign of heaven. They represent him shining all in light, with his hands hid under his robes, to show that his power does all things invisibly. He has at his right hand the famous Confucius, and at his left Lanza or Lanca, chief of the second sect of their religion.

FEAL, a provincial term for sod or turf.

FEAL-Dikes, a cheap kind of fence common in Scotland; built with feal or sod dug up by the spade from the surface of grass-ground, consisting of the upper mould rendered tough and coherent by the matted roots of the grass thickly interwoven with it. If only a very thin bit of the upper surface is pared off with a paring spade, the pieces are called *divots*. These being of a firmer consistence, are more durable when built into dike than feal, but much more expensive also.

FEALTY, in law, an oath taken on the admittance of any tenant, to be true to the lord of whom he holds.

Faustus
||
Fealty:

**Fear,
Feast.**

holds his land: by this oath the tenant holds in the freest manner, on account that all who have fee hold *per fidem et fiduciam*, that is, by fealty at the least.

This fealty, at the first creation of it, bound the tenant to fidelity, the breach of which was the loss of his fee. It has been divided into general and special: general, that which is to be performed by every subject to his prince; and special, required only of such as, in respect of their fee are tied by oath to their lords. To all manner of tenures, except tenancy at will, and frank-almoign, fealty is incident, though it chiefly belongs to copyhold estates held in fee and for life. The form of this oath, by stat. 17 Edw. II. is to run as follows. "I A. B. will be to you my lord D. true and faithful, and bear to you faith for the lands and tenements which I hold of you; and I will truly do and perform the customs and services that I ought to do to you. So help me God."

FEAR, one of the passions of the human mind: (see PASSION). It is defined, an apprehension of impending evil, attended with a desire of avoiding it.

Fear in the extreme is called *fright* or *terror*. See FRIGHT.

FEAR, in scripture, is used in various senses.

The *fear of God* is either filial or servile. The filial fear is a holy affection or gracious habit in the soul, whereby it is inclined to obey all God's commandments, and to hate and avoid evil. Slavish or servile fear is the consequence of guilt; it is a judicial impression from the sad thoughts of the provoked majesty of heaven; it is an alarm within that disturbs the rest of a sinner. Though this fear be in wicked men, yet it often proves a preparative to faith and repentance.

Fear is likewise used for the *object* of fear. Thus it is said, "the fear of Isaac," to describe the God whom Isaac feared, (Gen. xxxi. 42.), and in Prov. i. 26. "I will mock you when your fear cometh;" that is, the calamity you feared. God says, that he will send his fear before his people; that is, a dread wrought by him, in order to terrify and destroy the inhabitants of Canaan.

FEAR (*Metus, Pavor, or Timor*), was deified by the Pagans. Tullus Hostilius brought the worship of this deity to Rome. The Ephori of Sparta erected a temple to Fear, near their tribunal, to strike an awe into those who approached it. Fear was likewise worshipped at Corinth. The poets did not forget this imaginary deity. Virgil places her in the entrance of hell, in company with diseases, old age, &c. *Æn.* vi. 273. Ovid places her in the retinue of Tisiphone one of the furies, *Met.* iv. 483.

FEAST, or FESTIVAL, in a religious sense, is a ceremony of feasting and thanksgiving. The word is formed of the Latin *festum*, which some derive a *feriari* "to keep holiday;" others from the Greek *ἑστιάω* "I feast or entertain," of *ἑστία* "hearth, fire."

Feasts, and the ceremonies thereof, have made great part of the religion of almost all nations and sects; witness those of the Greeks, Romans, Hebrews, Christians, and Mahometans.

The first feasts among the Greeks were celebrated in solemn assemblies of the whole nation, on occasion of their games, as the Olympic, the Pythian, the Isthmian, and Næmean: in process of time they had many

others, the principal of which are enumerated in the course of this work.

The Romans also had abundance of stated feasts in honour of their deities and heroes; such were the Saturnalia, Cerealia, Lupercalia, Liberalia, Neptunalia, Consualia, Portumnalia, Vulcanalia, Palilia, Divalia, &c. See SATURNALIA, &c.

They had also feasts instituted occasionally; as Carmentalia, Quirinalia, Terminalia, Floralia, Compitalia, Lemuria, Vernalia, beside other moveable and occasional ones: as to give thanks to the gods for benefits received, to implore their assistance, or to appease their wrath, &c. as the Paganalia, Feralia, Bacchanalia, Ambarvalia, Amburbalia, Suovetaurilia, and divers others, particularly denominated *feriæ*; as Sementinæ, Latinæ, &c. See each of these feasts, and *feriæ* in its proper place. The feasts were divided into days of sacrifice, and days of banqueting and feasting; days of games, and days of rest or *feriæ*.

There being but little history written, or at least published in those days, one end of feasts was to keep up the remembrance of past occurrences.

The principal feasts of the Jews were the feasts of trumpets, that of the expiation, of tabernacles, of the dedication, of the passover, of pentecost, and that of purification. See EXPIATION, &c.

The modern Jews have other feasts marked in their kalendar of modern institution. The Mahometans, besides their weekly feast or sabbath, which is kept on Friday, have two solemn feasts, the first of which is called the *Feast of Victims*, and celebrated on the tenth day of the last month of their year; and the second called *Bairam*: The Chinese have two solemn feasts in the year, in memory of Confucius, besides others of less note on other days of the year.

Feasts among us are either *immoveable* or *moveable*.

Immoveable Feasts are those constantly celebrated on the same day of the year; the principal of these are Christmas-day or the Nativity, the Circumcision, Epiphany, Candlemas, or the Purification; Lady-day, or the Annunciation, called also the *Incarnation* and *Conception*; All Saints, and All Souls; besides the days of the several apostles, St Thomas, St Paul, &c. which with us are feasts, though not *feriæ*. See each feast under its proper article.

Moveable Feasts are those which are not confined to the same day of the year. Of these the principal is Easter, which gives law to all the rest, all of them following, and keeping their proper distances from it; such are Palm-Sunday, Good-Friday, Ash-Wednesday, Sexagesima, Ascension-day, Pentecost, and Trinity-Sunday. See EASTER, SEXAGESIMA PENTECOST, TRINITY, &c.

The four feasts which the English laws take special notice of are, the Annunciation of the blessed Virgin Mary or Lady-day, the 25th of March: the Nativity of St John the Baptist, held on the 24th of June; the Feast of St Michael the Archangel, on the 29th of September; and that of St Thomas the Apostle, on the 21st of December: on which quarterly days rent on leases is usually reserved to be paid (5 and 6 Edw. VI. cap. 3. 3 Jac. I. cap. 1. 12 Car. II. cap. 30.)

Beside these feasts which are *general*, and enjoined by the church, there are others *local* and *occasional*,

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enjoined by the magistrate, or voluntarily set on foot by the people; such are the days of thanksgiving for delivery from wars, plagues, &c. Such also are the vigils or wakes in commemoration of the dedications of particular churches. See VIGIL, &c.

The prodigious increase of the feast days in the Christian church commenced towards the close of the fourth century, and was occasioned by the discovery that was then made of the remains of martyrs and other holy men, for the commemoration of whom they were established. These, instead of being set apart for pious exercises, were abused in indolence, voluptuousness, and criminal practices. Many of them were instituted on a pagan model, and perverted to similar purposes.

FEAST of Death, or Feast of Souls, a solemn religious ceremony in use among the savages of America; some of whom thus testify their respect for the deceased every eight years; and others, as the Hurons and Iroquois, every ten years.

The day of this ceremony is appointed by public order; and nothing is omitted, that it may be celebrated with the utmost pomp and magnificence. The neighbouring tribes are invited to be present, and to join in the solemnity. At this time all who have died since the last solemn occasion are taken out of their graves: those who have been interred at the greatest distance from the villages are diligently sought for, and brought to this great rendezvous of carcases.

It is not difficult to conceive the horror of this general disinterment; but it cannot be described in a more lively manner than it is done by Lafitau, to whom we are indebted for the most authentic account of those nations.

"Without question (says he), the opening of these tombs displays one of the most striking scenes that can be conceived; this humbling portrait of human misery, in so many images of death, wherein she seems to take a pleasure to paint herself in a thousand various shapes of horror, in the several carcases, according to the degree in which corruption has prevailed over them, or the manner in which it has attacked them. Some appear dry and withered; others have a sort of parchment upon their bones; some look as if they were baked and smoked, without any appearance of rottenness; some are just turning towards the point of putrefaction; whilst others are all swarming with worms, and drowned in corruption. I know not which ought to strike us most, the horror of so shocking a sight, or the tender piety and affection of these poor people toward their departed friends; for nothing deserves our admiration more than that eager diligence and attention with which they discharge this melancholy duty of their tenderness; gathering up carefully even the smallest bones, handling the carcases, disgusting as they are, with every thing loathsome, cleansing them from the worms, and carrying them upon their shoulders through tiresome journeys of several days, without being discouraged from the offensiveness of the smell, and without suffering any other emotions to arise than those of regret, for having lost persons who were so dear to them in their lives, and so lamented in their death.

"They bring them into their cottages, where they prepare a feast in honour of the dead; during which their great actions are celebrated, and all the tender

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intercourses which took place between them and their friends are piously called to mind. The strangers, who have come sometimes many hundred miles to be present on the occasion, join in the tender condolence; and the women, by frightful shrieks, demonstrate that they are pierced with the sharpest sorrow. Then the dead bodies are carried from the cabins for the general reinterment. A great pit is dug in the ground, and thither, at a certain time, each person, attended by his family and friends, marches in solemn silence, bearing the dead body of a son, a father, or a brother. When they are all convened, the dead bodies, or the dust of those which were quite corrupted, are deposited in the pit: then the torrent of grief breaks out anew. Whatever they possess most valuable is interred with the dead. The strangers are not wanting in their generosity, and confer those presents which they have brought along with them for the purpose. Then all present go down into the pit, and every one takes a little of the earth, which they afterwards preserve with the most religious care. The bodies, ranged in order, are covered with entire new furs, and over these with bark, on which they throw stones, wood, and earth, then taking their last farewell, they return each to his own cabin.

"We have mentioned, that in this ceremony the savages offer, as presents to the dead, whatever they value most highly. This custom which is universal among them, arises from a rude notion of the immortality of the soul. They believe this doctrine most firmly, and it is the principal tenet of their religion. When the soul is separated from the body of their friends, they conceive that it still continues to hover around it, and to require and take delight in the same things with which it formerly was pleased. After a certain time, however, it forakes this dreary mansion, and departs far westward into the land of spirits. They have even gone so far as to make a distinction between the inhabitants of the other world; some, they imagine, particularly those who in their lifetime have been fortunate in war, possess a high degree of happiness, have a place for hunting and fishing, which never fails, and enjoy all sensual delights, without labouring hard in order to procure them. The souls of those, on the contrary, who happen to be conquered or slain in war, are extremely miserable after death."

FEAST is also used for a banquet, or a sumptuous meal, without any immediate view to religion.

The use of the word, in this sense, arises hence; that a part of the ceremony of many of the ancient festivals, both those of the heathens and agapæ of the Christians, was good eating; though Mr Huet chooses to derive the word from *festinare*, which is an ancient Latin version of Origen's Comment on Matthew, signifies "to feast:" *Ut veniens illuc Jesus festinet cum discipulis suis.*

Social or civil feasts were also expressed by the words *convivium* and *compotatio*, or *concanatio*. Cicero says, that in the Roman tongue, the word *convivium*, which means people assembled at table, is more significant than the Greek word *compotatio* or *concanatio*: the Roman, says he, expresses the conjunction of body and mind which ought to take place at an entertainment; the Greek denotes what relates to the body alone.

As

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As food is necessary to our existence, it makes a bond of association among mankind. People at a feast, says one of the ancients, seem to form but one body, one soul. All nations, whether savage or civilized, have regarded the pleasures of the table as the occasion of the most agreeable society. This species of enjoyment (abstracting from its susceptibility of abuse) makes but one family of all that it brings together. It levels the distinctions introduced by policy or prejudice, and disposes men to regard one another as brethren. It is here that people feel the equality established by nature; here they forget the evils of life; they extinguish their hatred, and make their enmities cease. For this reason Aristotle considers as a breach of the social principle that custom of the Egyptians of eating apart, and praises the convivial repasts established by Minos and Lycurgus.

The Persians generally deliberated on business at table, but never determined or put their determinations in execution except in the morning before having eaten.

When the Germans, says Tacitus, wanted to reconcile enemies, to make alliances, to name chiefs, or to treat of war and peace; it was during the repast that they took counsel; a time in which the mind is most open to the impressions of simple truths, or most easily animated to great attempts. These artless people during the conviviality of the feast spoke without disguise. Next day they weighed the counsels of the former evening: they deliberated at a time when they were not disposed to feign, and took their resolution when they were least liable to be deceived.

People of rank among the Rhodians, by a fundamental law of the state, were obliged to dine daily with those who had the management of affairs, in order to deliberate with them concerning such things as were necessary or useful for the country; and on this account the principal ministers of the kingdom were obliged to keep open table for all who could be of use to the state.

Among the Romans, the place where they supped was generally the vestibule, that a more retired part of the house might not encourage licentiousness and disorder. There were several laws that restricted their meals to these vestibules.

When luxury reigned in Rome, they had superb halls for their entertainments. Lucullus had many, each of which bore the name of some deity; and this name was a mark which indicated to the servants the expence of the entertainment. The expence of a supper in Lucullus's hall of Apollo amounted to 50,000 drachmas.

The hall in which Nero feasted, by the circular motion of its walls and ceiling, imitated the revolutions of the heavens, and represented the different seasons of the year, changing at every course, and showering down flowers and perfumes on the guests.

The Romans did not, as we do, use but one table at their feasts; they had generally two; the first was for the services of animal food, which was afterwards removed, and another introduced with fruits; at this last they sung and poured out their libations. The Greeks and eastern nations had the same custom, and even the Jews in their solemn feasts and at sacrifices.

The Romans, in the time of Nero, had tables made

of citron wood brought from Mauritania, they were varnished with purple and gold, and were raised on feet of carved ivory. It is said that they were more precious than gold. Dion Cassius affirms, that Seneca had 500 of these, which he made use of one after another; and Tertullian tells us that Cicero had but one. The Romans chose the king of the feast by a throw of the dice.

We learn from Herodotus, that the ancients had neither cups nor bowls, but that they drank out of little horns tipped with silver or gold.

Under the reign of Charles V. of France, the custom of placing the lights upon the table was not yet introduced. A number of domestics held the candles in their hands during the whole time of the repast.

The Greeks and Romans kept a domestic for the purpose of reading during their meals and feasts. Sometimes the chief of the family himself performed the office of reader; and history informs us, that the Emperor Severus often read while his family ate. The time of reading was generally at supper; and guests were invited to a reading as they are now a-days to play cards.

The Greeks, in their flourishing times, did not profane, according to their own expression, the *holiness* of the table; but rather adorned it with ingenious and elegant conversation: they proposed moral topics, of which Plutarch has preserved a collection.

Ancient philosophers remark, that heroes rarely assembled convivially without bringing affairs of consequence into discourse, or deliberating upon those that regarded either present events or future contingencies.

The Scythians, while at meat, used to make the strings of their bows resound, lest their warlike virtues might be enfeebled or lost in this season of pleasure.

When Rome was corrupted with luxury, singers, dancers, musicians, stage-players, and people that told pleasant tales, were brought into the hall to amuse the guests.

Plutarch informs us, that Cæsar, after his triumphs, treated the Roman people at 22,000 tables; and by calculation it would seem that there were at these tables upwards of 200,000 persons.

At the end of the feast the Romans drank out of a large cup as often as there were letters in the name of their mistresses.

Feasting seems to have been the chief delight of the Germans, Gauls, Britons, and all the other Celtic nations; in which they indulged themselves to the utmost, as often as they had an opportunity. "Among these nations (says an author who had carefully studied their manners) there is no public assembly, either for civil or religious purposes, duly held; no birth-day, marriage, or funeral properly celebrated; no treaty of peace or alliance rightly cemented, without a great feast." It was by frequent entertainments of this kind that the great men or chieftains gained the affections and rewarded the services of their followers; and those who made the greatest feasts were sure to be most popular, and to have the greatest retinue. These feasts (in which plenty was more regarded than elegance) lasted commonly several days, and the guests seldom retired until they had consumed all the provisions and exhausted all the liquors. Athenæus describes

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Pollutier
Hist. Celt.
l. 2, c. 12.
p. 463.

Feast. scribes an entertainment that was given by Arcamnes, a very wealthy prince in Gaul, which continued a whole year without interruption, and at which all the people of Gaul, and even all strangers who passed through that country, were made welcome. At these feasts they sometimes consulted about the most important affairs of state, and formed resolutions relating to peace and war; imagining that men spoke their real sentiments with the greatest freedom, and were apt to form the boldest designs, when their spirits were exhilarated with the pleasures of the table. The conversation at these entertainments very frequently turned on the great exploits which the guests themselves or their ancestors had performed in war; which sometimes occasioned quarrels and even bloodshed. It was at a feast that the two illustrious British princes, Carbar and Oscar, quarrelled about their own bravery and that of their ancestors, and fell by mutual wounds, (*Ossian*, vol. ii. p. 8, &c.)

As to the drink used at those feasts, particularly in Britain, it seems probable, that before the introduction of agriculture into the island, mead or honey diluted with water was the only strong liquor known to its inhabitants, as it was to many other ancient nations in the same circumstances. This continued to be a favourite beverage among the ancient Britons and their posterity long after they had become acquainted with other liquors. The mead-maker was the eleventh person in dignity in the courts of the ancient princes of Wales, and took place of the physician. The following ancient law of that principality shows how much this liquor was esteemed by the British princes.—“There are three things in the court which must be communicated to the king before they are made known to any other person: 1. Every sentence of the judge; 2. Every new song; and, 3. Every cask of mead.” This was perhaps the liquor which is called by Ossian the joy and strength of shells, with which his heroes were so much delighted.—After the introduction of agriculture, ale or beer became the most general drink of all the British nations who practised that art, as it had long been of all the Celtic people on the continent. (See ALE.) If the Phœnicians or Greeks imported any wine into Britain, it was only in very small quantities; that most generous liquor being very little known in that island before it was conquered by the Romans. The drinking vessels of the Gauls, Britons, and other Celtic nations were, for the most part, made of the horns of oxen and other animals; but those of the Caledonians consisted of large shells, which are still used by some of their posterity in the Highlands of Scotland.

The dishes in which the meat was served up were either of wood or earthen-ware, or a kind of baskets made of osiers. These last were most used by the Britons, as they very much excelled in the art of making them both for their own use and for exportation. The guests sat in a circle upon the ground, with a little hay, grass, or the skin of some animal under them. A low table or stool was set before each person, with the portion of meat allotted to him upon it. In this distribution, they never neglected to set the largest and best pieces before those who were most distinguished for their rank, their exploits, or their riches. Every guest took the meat set before him in his hands,

and tearing it with his teeth, fed upon it in the best manner he could. If any one found difficulty in separating any part of his meat with his hands and teeth, he made use of a large knife, that lay in a particular place for the benefit of the whole company. Servants, or young boys and girls, the children of the family, stood behind the guests ready to help them to drink or any thing they wanted.

As the ancient Britons greatly excelled and very much delighted in music, all their feasts were accompanied with the joys of song, and the music of harps. In the words of Ossian †, “whenever the feast of shells † Vol. II. is prepared, the songs of bards arise. The voice of p. 9. sprightly mirth is heard. The trembling harps of joy Vol. I. are strung. They sing the battles of heroes, or the P. 37. heaving breasts of love.” Some of the poems of that illustrious British bard appear to have been composed in order to be sung by the hundred bards of Fingal * *Ibid.* at the feast of Selma. Many of the songs of the bards Vol. I. which were sung and played at the feast of the ancient P. 87, 209. Britons, were of a grave and solemn strain, celebrating the brave actions of the guests, or of the heroes of other times; but these were sometimes intermixed with more sprightly and cheerful airs, to which the youth of both sexes danced, for the entertainment of the company.

It has been often observed by authors, that there is no nation in the world comes near the English in the magnificence of their feasts. Those made at their coronations, instalments, consecrations, &c. transcend the belief of all foreigners; and yet it is doubted whether those now in use are comparable to those of their forefathers.

William the Conqueror, after he was peaceably settled on the throne of England, sent agents into different countries, to collect the most admired and rare dishes for his table; by which means, says John of Salisbury, that island, which is naturally productive of plenty and variety of provisions, was overflowed with every thing that could inflame a luxurious appetite. The same writer tells us, that he was present at an entertainment which lasted from three o'clock in the afternoon to midnight; at which delicacies were served up, which had been brought from Constantinople, Babylon, Alexandria, Palestine, Tripoli, Syria, and Phœnicia. These delicacies, we may presume, were very expensive. Thomas Becket, if we may believe his historian Fitz-Stephen, gave L. 5, equivalent to L. 75 at present, for one dish of eels. The sumptuous entertainments which the kings of England, and of other countries, gave to their nobles and prelates, at the festivals of Christmas, Easter, and Whitsuntide, in which they spent a great part of their revenues, contributed very much to diffuse a taste for profuse and expensive banqueting. It was natural for a proud and wealthy baron to imitate in his own castle the entertainments he had seen in the palace of his prince. Many of the clergy too, both seculars and regulars, being very rich, kept excellent tables. The monks of St Swithins, at Winchester, made a formal complaint to Henry II. against their abbot, for taking away three of the 13 dishes they used to have every day at dinner. The monks of Canterbury were still more luxurious: for they had at least 17 dishes every day, besides a desert; and these dishes were dressed with spices and sauces, which

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which excited the appetite as well as pleased the taste.

Great men had some kinds of provisions at their tables that are not now to be found in Britain. When Henry II. entertained his own court, the great officers of his army, with all the kings and great men of Ireland, in Dublin, at the feast of Christmas, A. D. 1171, the Irish princes and chieftains were quite astonished at the profusion and variety of provisions which they beheld, and were with difficulty prevailed upon by Henry to eat the flesh of cranes, a kind of food to which they had not been accustomed. In the remaining monuments of this period, we meet with the names of several dishes, as *dellegrout*, *maupigyrnum*, *karumpie*, &c. the composition of which is now unknown.

The coronation-feast of Edward III. cost L. 2835, 18s. 2d. equivalent to about L. 40,000 sterling. At the installation of Ralph, abbot of St Augustine, Canterbury, A. D. 1309, 6000 guests were entertained with a dinner, consisting of 3000 dishes, which cost L. 287:5:0, equal in efficacy to L. 4300 sterling. "It would require a long treatise (says Matthew Paris) to describe the astonishing splendour, magnificence, and festivity with which the nuptials of Richard earl of Cornwall, and Cincia daughter of Reimund earl of Provence, were celebrated at London, A. D. 1243. To give the reader some idea of it, in a few words, above 30,000 dishes were served up at the marriage dinner." The nuptials of Alexander III. of Scotland, and the Princess Margaret of England, were solemnized at York, A. D. 1251, with still greater pomp and profusion. "If I attempted (says the same historian) to display all the grandeur of this solemnity,—the numbers of the noble and illustrious guests,—the richness and variety of the dresses,—the sumptuousness of the feasts,—the multitudes of the minstrels, mimicks, and others whose business it was to amuse and divert the company, those of my readers who were not present should imagine that I was imposing upon their credulity. The following particular will enable them to form a judgment of the whole. The archbishop of York made the king of England a present of 60 fat oxen, which made only one article of provision for the marriage-feast, and were all consumed at that entertainment.

The marriage-feast of Henry IV. and his queen Jane of Navarre, consisted of six courses; three of flesh and fowl, and three of fish. All these courses were accompanied and adorned with *suttleties*, as they were called. These *suttleties* were figures in pastry, of men, women, beasts, birds, &c. placed on the table, to be admired, but not touched. Each figure had a label affixed to it; containing some wise or witty saying, suited to the occasion of the feast, which was the reason they were called *suttleties*. The installation feast of George Neville, archbishop of York and chancellor of England, exceeded all others in splendor and expence, and in the number and quality of the guests. The reader may form some idea of this enormous feast from the following list of provisions prepared for it. In wheat, quarters, 300; in ale, tuns, 300; in wine, runs, 100; in ipocrasse, pipes, 1; in oxen; 104; in wild bulls, 6; in muttons, 1000; in veals, 304; in porkes, 304; in swanns, 400; in geese, 2000; in

cappons, 1000; in pigs, 2000; in plovers, 400; in quails, 1200; in fowls called rees, 2400; in peacocks, 104; in mallards and teals, 4000; in cranes, 204; in kidds, 204; in chickens, 2000; in pigeons, 2000; in conies, 4000; in bittors, 204; in heron-shaws, 400; in pheasants, 200; in partridges, 500; in woodcocks, 400; in curlews, 100; in egrits, 1000; in staggs, bucks, and roes, 500 and more; in pasties of venison, cold, 4000; in parted dishes of jellies, 1000; in plain dishes of jellies, 3000; in cold tarts, baked, 4000; in cold custards, baked, 3000; in hot pasties of venison, 1500; in hot custards, 2000; in pikes and breams, 301; in porpoises and seals, 12; spices, sugared delicates, and wafers, plenty. No turkeys are mentioned in this enormous bill of fare, because they were not then known in England. Cranes, heronshaws, porpoises, and seals, are seldom seen at modern entertainments.

One of the most expensive singularities attending the royal feasts in those days consisted in what they called *intermeats*. These were representations of battles, sieges, &c. introduced between the courses, for the amusement of the guests. The French excelled in exhibitions of this kind. At a dinner given by Charles V. of France, to the Emperor Charles IV. A. D. 1378, the following intermeat was exhibited: A ship with masts, sails, and rigging, was seen first: she had for colours the arms of the city of Jerusalem: Godfrey de Bouillon appeared upon deck, accompanied by several knights armed cap-a-pee: the ship advanced into the middle of the hall, without the machine which moved it being perceptible. Then the city of Jerusalem appeared, with all its towers lined with Saracens. The ship approached the city; the Christians landed, and began the assault; the besieged made a good defence; several scaling-ladders were thrown down; but at length the city was taken. *Intermeats* at ordinary banquets consisted of certain delicate dishes introduced between the courses, and designed rather for gratifying the taste than for satisfying hunger.

At those feasts, besides the ordinary drinks, ale and cyder, there were great quantities of wines of various kinds. Of these last, the following lines of a poet who wrote in the fourth century, contain an ample enumeration.

Ye shall have rumney and malespine,
Both ypocrasse and vernage wyne;
Mountrese and wyne of Greke,
Both algrade and despice eke,
Antioche and bastarde,
Pymment also, and garnarde,
Wyne of Greke and Muscadell,
Both clare, pymment, and Rochell.

Some of these liquors, as ypocrass, pymment, and claret, were compounded of wine, honey, and spices of different kinds, and in different proportions.

FEATHER, in physiology, a general name for the covering of birds: it being common to all the animals of this class to have their whole body, or at least the greatest part of it, covered with feathers or plumage. See ORNITHOLOGY, Sect. I. art. iv.

Feathers make a considerable article in commerce, particularly those of the ostrich, heron, swan, peacock, goose, &c. for plumes, ornaments of the head, filling of beds, writing pens, &c.

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Feather.

Febrifuge
Feciales

Geese are plucked in some parts of Great-Britain five times in the year; and in cold seasons many of them die by this barbarous custom, (see ANAS.)—Those feathers that are brought from Somersetshire are esteemed the best, and those from Ireland the worst.

* See the
article
Down.

Eider down * is imported from Denmark; the ducks that supply it being inhabitants of Hudson's Bay, Greenland, Iceland, and Norway. The islands west of Scotland breed numbers of these birds, which turn out a profitable branch of trade to the poor inhabitants. Hudson's Bay also furnishes very fine feathers, supposed to be of the goose kind. The down of the swan is brought from Dantzic. The same place also produces great quantities of the feathers of the cock and hen. The London poulterers sell a great quantity of the feathers of those birds, and of ducks and turkeys: those of ducks being a weaker feather, are inferior to those of the goose; and turkeys feathers are the worst of any. The best method of curing feathers is to lay them in a room, in an exposure to the sun; and when dried, to put them in bags, and beat them well with poles to get the dirt off.

FEBRIFUGE, an appellation given to such medicines as mitigate or remove a fever.

FEBRUARY, in chronology, the second month of Numa's year, and under the protection of the god Neptune. This month is not found in the kalendar of Romulus, but was added to the year by Numa. It had its name from *Februa*, *Februaca*, or *Februalis*, all names of Juno, who presided over the purifications of women; and in this month the Lupercalia were held in honour of Juno, and women were purified by the priests of Pan Lyceus at that festival. See LUPERCALIA.

February, in a common year, consists only of 28 days; but in the bissextile year it has 29, on account of the intercalary day added that year.

FECIALES, or FOECIALES, an order of priests or officers, consisting of 20 persons, among the ancient Romans, appointed to proclaim war, negotiate peace, &c.

Festus derives the words from *ferio*, "I strike;" as *ferire fedus* signifies "to conclude a treaty;" and accordingly, instead of *feciales*, he would have it written *feriales*. Others derive it from *fedus*, which was anciently written *sedus*; or from *fides*, "faith." Others from *facio*, *fecit*, "I make," &c. because they made war and peace. Vossius chooses to derive it from *fatu*, of the verb *fari*, "to speak;" in which sense the *feciales* should be the same with *oratores*; which sentiment is also confirmed by the authority of Varro, who says they were called indifferently *feciales* and *oratores*.

The *feciales* were a sort of heralds, who, when the Romans had any disputes with their neighbours, were sent first to demand the thing pretended to be usurped, or require satisfaction for the injury alledged to be done. If an answer was not returned by them that was satisfactory to the people and the senate, they were dispatched again to declare war, and the like in treating of peace; the *feciales* being the only persons appointed to negotiate between the senate, &c. and the enemy.

Plutarch, in the life of Numa, and Halicarnassensis (*lib. ii.*) observes, that they were first instituted by that prince. The latter adds, that they were chosen out of the best families in Rome; that their office, which was reputed a sort of sacerdotium, or priesthood, only ended

with their life; that their persons were sacred and inviolable, as those of other priests; that they were even charged to see the republic did not declare war unjustly; that they were to receive the complaints and remonstrances of nations who pretended to have been any way injured by the Romans; that if those complaints were found just, they were to seize the criminals, and deliver them up to those they had offended; that they were invested with the rights and privileges of ambassadors; that they concluded treaties of peace and alliance, and took care they were executed; and, lastly, abolished them, if they were found not to be equitable. Livy, lib. i. cap. 24. ascribes their institution to Ancus Martius, in the year of Rome 114.—Varro assures us, that in his time most of these functions of the *feciales* were set aside; though Plutarch observes, that they had still some authority in his time.

The *feciales* were crowned with *verbena*, "vervain," when they went to declare war. Their head was covered with a veil, over which the crown was applied. In this equipage they proceeded to the frontiers of the new enemy's country, and threw a bloody dart or javelin into the ground within the same. In Livy and other ancient authors we have the formula used in such declarations.

FECUNDITY, the same with FERTILITY.

FEE, in law, signifies a complete feudal property. Hence, where the bare liferent of any feudal subject is meant to be conveyed to A, and the absolute property to B, that meaning is expressed thus: "to A in liferent, and to B in fee." See LAW, N^o lxxix. clxiv.

Fees are commonly divided into *absolute*, otherwise called *fees-simple*; and *limited*, one species of which is usually called *fee-tail*.

I. Tenant in fee-simple (or, as he is frequently styled, *tenant in fee*), is he that hath lands, tenements, or hereditaments, to hold to him and his heirs forever; generally, absolutely, and simply; without mentioning what heirs, but referring that to his own pleasure, or to the disposition of the law. The true meaning of the word *fee* (*feodum*) is the same with that of *feud* or *fief*, and in its original sense it is taken in contradiction to *allodium*; which latter the writers on this subject define to be every man's own land, which he possesseth merely in his own right, without owing any rent or service to any superior. This is property in its highest degree; and the owner thereof hath *absolutum et directum dominium*, and therefore is said to be seised thereof absolutely in *dominio suo*, in his own demesne. But *feodum*, or *fee*, is that which is held of some superior, on condition of rendering him service; in which superior the ultimate property of the land resides. And therefore Sir Henry Spelman defines a feud or fee to be, The right which the vassal or tenant hath in lands to use the same, and take the profits thereof to him, and his heirs, rendering to the lord his due services; the mere allodial property of the soil always remaining in the lord. This allodial property no subject in Britain has; it being a received and now undeniable principle in the law, that all the lands are holden mediately or immediately of the king. The king therefore only hath *absolutum et directum dominium*; but all subjects lands are in the nature of *feodum* or *fee*, whether derived to them by descent from their ancestors, or purchased for a valuable consideration: for they cannot

Fecundity,
Fee.

Blackst.
Comment.

+ See Feodal
System.

Fee.

not come to any man by either of those ways, unless accompanied with those feudal clogs which were laid upon the first feudatory when it was originally granted. A subject therefore hath only the usufruct, and not the absolute property, of the soil; or, as Sir Edward Coke expresses it, he hath *dominium utile*, but not *dominium directum*. And hence it is, that, in the most solemn acts of law, we express the strongest and highest estate that any subject can have by these words, "he is seised thereof in his demesne, as of fee." It is a man's demesne, *dominium*, or property, since it belongs to him and his heirs for ever: yet this *dominium*, property, or demesne, is strictly not absolute or allodial, but qualified or feudal; it is in his demesne, *as of fee*; that is, it is not purely and simply his own, since it is held of a superior lord, in whom the ultimate property resides.

This is the primary sense and acceptation of the word *fee*. But (as Sir Martin Wright very justly observes) the doctrine, "that all lands are *holden*," having been for so many ages a fixed and undeniable axiom, the English lawyers do very rarely (of late years especially) use the word *fee* in this its primary original sense, in contradistinction to *allodium* or absolute property, with which they have no concern; but generally use it to express the continuance or quantity of estate. A *fee* therefore, in general, signifies an estate of inheritance; being the highest and most extensive interest that a man can have in a feud: and when the term is used simply, without any other adjunct, or has the adjunct of *simple* annexed to it (as, a *fee*, or a *fee-simple*), it is used in contradistinction to a *fee-conditional* at the common law, or a *fee-tail* by the statute; importing an absolute inheritance, clear of any condition, limitation, or restrictions to particular heirs, but descendible to the heirs-general, whether male or female, lineal or collateral. And in no other sense than this is the king said to be seised in *fee*, he being the feudatory of no man.

Taking therefore *fee* in this its secondary sense, as a state of inheritance, it is applicable to, and may be had in, any kind of hereditaments either corporeal or incorporeal. But there is this distinction between the two species of hereditaments; that of a corporeal inheritance a man shall be said to be seised in his demesne, *as of fee*; of an incorporeal one he shall only be said to be seised *as of fee*, and not in his demesne. For as incorporeal hereditaments are in their nature collateral to, and issue out of, lands and houses, their owner hath no property, *dominium*, or demesne, in the thing itself, but hath only something derived out of it; resembling the *servitudes*, or services, of the civil law. The *dominium*, or property, is frequently in one man, while the appendage or service is in another. This Gaius may be seised *as of fee*, of a way going over the land, of which Titius is seised in his demesne *as of fee*.

The *fee-simple* or inheritance of lands and tenements is generally vested and resides in some person or other; though divers inferior estates may be carved out of it. As if one grants a lease for 21 years, or for one or two lives, the *fee-simple* remains vested in him and his heirs; and after the determination of those years or lives, the land reverts to the grantor or his heirs, who shall hold it again in *fee-simple*. Yet sometimes the *fee* may be in *abeyance*, that is (as the word signifies) in expectation, remembrance, and contemplation in law; there

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being no person *in esse*, in whom it can vest and abide, though the law considers it as always potentially existing, and ready to vest whenever a proper owner appears. Thus, in a grant to John for life, and afterwards to the heirs of Richard, the inheritance is plainly neither granted to John nor Richard, nor can it vest in the heirs of Richard till his death, *nam nemo est heres viventis*: it remains therefore in waiting, or *abeyance*, during the life of Richard. This is likewise always the case of a parson of a church, who hath only an estate therein for the term of his life: and the inheritance remains in *abeyance*. And not only the *fee*, but the freehold also, may be in *abeyance*; as, when a parson dies the freehold of his glebe is in *abeyance* until a successor be named, and then it vests in the successor.

The word *heirs* is necessary in the grant or donation in order to make a *fee* or inheritance. For if land be given to a man for ever, or to him and his assigns for ever, this vests in him but an estate for life. This very great nicety about the insertion of the word *heirs* in all feoffments and grants, in order to vest a *fee*, is plainly a relic of the feudal strictness: by which it was required, that the form of the donation should be punctually pursued; or that, as Craig expresses it in the words of Baldus, *donationes sint stricti juris, ne quis plus donasse presumatur quam in donatione expresserit*. And therefore as the personal abilities of the donee were originally supposed to be the only inducements to the gift, the donee's estate in the land extended only to his own person, and subsisted no longer than his life; unless the donor, by an express provision in the grant, gave it a longer continuance, and extended it also to his heirs. But this rule is now softened by many exceptions.

For, 1. It does not tend to devise by will; in which, as they were introduced at the time when the feudal rigour was apace wearing out, a more liberal construction is allowed: and therefore by a devise to a man for ever, or to one and his assigns for ever, or to one in *fee-simple*, the devisee hath an estate of inheritance, for the intention of the deviser is sufficiently plain from the words of perpetuity annexed, though he hath omitted the legal words of inheritance. But if the devise to be a man and his assigns, without annexing words of perpetuity, there the devisee shall take only an estate for life; for it does not appear that the deviser intended any more. 2. Neither does this rule extend to fines or recoveries, considered as a species of conveyance; for thereby an estate in *fee* passes by act and operation of law without the word *heirs*: as it does also, for particular reasons, by certain other methods of conveyance, which have relation to a former grant or estate, wherein the word *heirs* was expressed. 3. In creations of nobility by writ, the peer so created hath an inheritance in his title, without expressing the word *heirs*; for they are implied in the creation, unless it be otherwise specially provided: but in creations by patent, which are *stricti juris*, the word *heirs* must be inserted, otherwise there is no inheritance. 4. In grants of lands to sole corporations and their successors, the word *successors* supplies the place of *heirs*; for as heirs take from the ancestor, so doth the successor from the predecessor. Nay, in a grant to a bishop, or other sole spiritual corporation, in *frankalmoin*, the word *frankalmoin* supplies the place of *successors* (as the word *successors* supplies the place of

A a

heirs)

Fee. *heirs*) *ex vi termini*; and in all these cases a fee-simple vests in such sole corporation. But, in a grant of lands to a corporation aggregate, the word *successors* is not necessary, though usually inserted: for, albeit such simple grant be strictly only an estate for life, yet as that corporation never dies, such estate for life is perpetual, or equivalent to a fee-simple, and therefore the law allows it to be one. Lastly, in the case of the king, a fee-simple will vest in him, without the word *heirs* or *successors* in the grant; partly from prerogative royal, and partly from a reason similar to the last, because the king, in judgment of law, never dies. But the general rule is, that the word *heirs* is necessary to create an estate of inheritance.

II. We are next to consider limited fees, or such estates of inheritance as are clogged and confined with conditions or qualifications of any sort. And these we may divide into two sorts: 1. *Qualified*, or *base* fees; and, 2. *Fees conditional*, so called at the common law and afterwards *fees-tail*, in consequence of the statute *de donis*.

1. A *base* or *qualified* fee, is such a one as has a qualification subjoined thereto, and which must be determined whenever the qualification annexed to it is at an end. As, in the case of a grant to A and his heirs, tenants in the manor of Dale: in this instance, whenever the heirs of A cease to be tenants of that manor, the grant is entirely defeated. So, when Henry VI. granted to John Talbot, lord of the manor of Kingston-Lisse in Berks, that he and his heirs, lords of the said manor, should be peers of the realm, by the title of *barons of Lisse*; here John Talbot had a *base* or *qualified* fee in that dignity; and the instant he or his heirs quitted the seigniorship of this manor, the dignity was at an end. This estate is a fee, because by possibility it may endure for ever in a man and his heirs; yet as that duration depends upon the concurrence of collateral circumstances, which qualify and debase the purity of the donation, it is therefore a *qualified* or *base* fee.

2. As to *fees-conditional*, or *fees-tail*, see the article **TAIL**.

FEE also signifies a certain allowance to physicians, barristers, attornies, and other officers, as a reward for their pains and labour.

If a person refuse to pay an officer his due fees, the court will grant an attachment against him, to be committed till the fees are paid; and an attorney may bring an action of the case for his fees against the client that retained him in his cause.

FEE also denotes a settled perquisite of public officers, payable by those who employ them.

The fees due to the officers of the custom-house, are expressly mentioned in a schedule, or table, which is hung up in public view in the said office, and in all other places where the said fees are to be paid or received. And if any officer shall offend, by acting contrary to the regulations therein contained, he shall forfeit his office and place, and be for ever after incapable of any office in the custom-house.

The other public offices have likewise their settled fees, for the several branches of business transacted in them.

FEE-Farm, a kind of tenure without homage, fealty, or other service, except that mentioned in the feoff-

ment; which is usually the full rent, or at least a fourth part of it.

The nature of this tenure is, that if the rent be behind, and unpaid for two years, then the feoffor and his heirs may have an action for the recovery of the lands.

FEELERS, in natural history, a name used by some for the horns of **INSECTS**.

FEELING, one of the five external senses, by which we obtain the ideas of solid, hard, soft, rough, hot, cold, wet, dry, and other tangible qualities. See **ANATOMY**, n° 138.

FEET. See **FOOT**.

FEET-Bearer, the name of an officer in the courts of the ancient Anglo-Saxon and Welch kings. He was a young gentleman whose duty it was to sit on the floor, with his back towards the fire, and hold the kings feet in his bosom all the time he sat at table, to keep them warm and comfortable †: A piece of state + *Liges Wallia*, in luxury unknown in modern times.

FEINT, in fencing, a show of making a thrust at one part, in order to deceive the enemy, that you may really strike him in another.

A simple feint is a mere motion of the wrist, without stirring the foot.

FELAPTON, in logic, one of the six first modes of the third figure of syllogisms; whereof the first proposition is an universal negative, the second an universal affirmative, and the third a particular negative.

FELIBIEN (Andre), was born at Chartres in 1619, and went secretary under the marquis de Fontenay Mareuil ambassador to the court of Rome in 1647. On his return, M. Colbert procured him the places of historiographer to the king, superintendant of his buildings, and of arts and manufactures in France. He became afterwards deputy comptroller-general of the bridges and dykes in that kingdom; and died in 1695. He wrote several pieces relating to the fine arts; the principal of which is his "Dialogues on the lives and works of the most eminent painters."

FELICITAS, (**FELICITY**, or *Happiness*), was deified by the ancient Pagans. Lucullus built a temple to her. She had another erected by Lepidus. The Greeks paid divine worship to *Maccaria*, daughter of Hercules, the same with *Felicitas*. This deity is often pictured upon medals, and generally with a Cornucopia in one hand and a Caduceus in the other. The inscriptions are, *Felicitas Temporum*, *Felicitas Augusti*, *Felicitas Publica*.

FELIS, in zoology, a genus of quadrupeds belonging to the order of *teræ*, the characters of which are CXCI. and these: The fore-teeth are equal; the molares or grinders have three points; the tongue is furnished with rough sharp prickles, and pointing backwards; and the claws are sheathed and retractile. This genus comprehends twenty-one species, viz.

I. The *Leo*, or lion. The largest lions are from eight to nine feet in length, and from four to six feet high: those of a smaller size are generally about 5½ feet long, and about 3¼ high. His head is very thick, and his face is beset on all sides with long bushy yellowish hair; this shaggy hair extends from the top of the head to below the shoulders, and hangs down to his knees: the belly and breast are likewise covered with long.

Feelers
Felis.

+ *Liges Wallia*

p. 38.

See Plates.
CXCI. and
CXCII.

Lion.

Felis.

long hair. The rest of the body is covered with very short hair, excepting a bush at the point of the tail. The ears are roundish, short, and almost entirely concealed under the hair of his front. The shagginess of the fore-part of his body makes the hinder part have a naked appearance. The tail is long and very strong; the legs are thick and fleshy; and the feet are short; the length of the claws is about an inch and a quarter, are of a whitish colour, very crooked, and can be extended or retracted into the membranous sheath at pleasure: their points are seldom blunted, as they are never extended but when he seizes his prey.

The female, or lioness, has no mane, or long hair about her head or shoulders; in her we see distinctly the whole face, head, ears, neck, shoulders, breast, &c. all these parts being in some measure concealed under the long hair of the male, give the female a very different appearance; besides, she is considerably less than the male. The hair of both male and female is of a yellowish colour, and whitish on the sides and belly.

In warm countries, quadrupeds in general are larger and stronger than in the cold or temperate climates. They are likewise more fierce and hardy; all their natural qualities seem to correspond with the ardour of the climate. The lions nourished under the scorching sun of Africa or the Indies, are the most strong, fierce, and terrible. Those of mount Atlas, whose top is sometimes covered with snow, are neither so strong nor so ferocious as those of Biledulgerid or Zaara, whose plains are covered with burning sand. It is in these hot and barren deserts, that the lion is the dread of travellers, and the scourge of the neighbouring provinces. But it is a happy circumstance that the species is not very numerous: they even appear to diminish daily. The Romans, says Mr Shaw, brought many more lions out of Libya for their public shows, than are now to be found in that country. It is likewise remarked, that the lions in Turkey, Persia, and the Indies, are less numerous than formerly. As this formidable and courageous animal makes a prey of most other animals, and is himself a prey to none, this diminution in the number of the species can be owing to nothing but an increase of the number of mankind: for it must be acknowledged, that the strength of this kind of animals is not a match for the dexterity and address of a negro or Hottentot, who will often dare to attack him face to face, and with very slight weapons.

The ingenuity of mankind augments with their number; that of other animals continues always the same. All the noxious animals, as the lion, are reduced to a small number, not only because mankind are become more numerous, but likewise because they have become more ingenious, and have invented weapons which nothing can resist. This superiority in the numbers and industry of mankind, at the same time that it has broke the vigour of the lion, seems likewise to have enervated his courage. This quality, though natural, is exalted or lowered according to the good or bad success with which any animal has been accustomed to employ his force. In the vast deserts of Zaara; in those which seem to separate two very different races of men, the Negroes and Moors, between Senegal and the boundaries of Mauritania; in those

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uninhabited regions above the country of the Hottentots; and in general, all the meridional parts of Africa and Asia, where mankind have disdained to dwell, lions are still as numerous and as ferocious as ever. Accustomed to measure their strength by that of all other animals which they encounter, the habit of conquering renders them haughty and intrepid. Having never experienced the strength of man, or the power of his arms, instead of discovering any signs of fear, they disdain and set him at defiance. Wounds irritate, but do not terrify them: they are not even disconcerted at the sight of numbers. A single lion of the desert has been known to attack a whole caravan; and if, after a violent and obstinate engagement, he found himself weakened, he retreats fighting, always keeping his face to the enemy. On the other hand, the lions which live near the villages or huts of the Indians or Africans, being acquainted with man and the force of his arms, are so dastardly as to fly and leave their prey at the sight of women or children.

This softening in the temper and disposition of the lion, shows that he is capable of culture, and susceptible, at least to a certain degree, of the impressions that he receives: accordingly, history informs us of lions yoked in triumphal chariots, trained to war, or the chase; and, that faithful to their masters, they never employed their strength or courage but against their enemies. It is certain, that a lion taken young, and brought up among domestic animals, will easily be accustomed to live and sport with them; that he is mild and caressing to his master, especially when he is young; and that, if his natural ferocity sometimes breaks out, it is rarely turned against those who have been kind to him. But, as his passions are impetuous and vehement, it is not to be expected that the impressions of education will at all times be sufficient to balance them: for this reason it is dangerous to let him suffer hunger long, or to vex him by ill-timed teazings: bad treatment not only irritates him, but he remembers it long, and meditates revenge. On the other hand, he is exceedingly grateful, and seldom forgets benefits received. He has been often observed to disdain weak or insignificant enemies, to despise their insults, and to pardon their offensive liberties. When led into captivity, he will discover symptoms of uneasiness, without anger or peevishness: on the contrary his natural temper softens, he obeys his master, caresses the hand that gives him food, and sometimes gives life to such animals as are thrown to him alive for prey: by this act of generosity he seems to consider himself as for ever bound to protect them; he lives peaceably with them; allows them a part, and sometimes the whole, of his food; and will rather submit to the pangs of hunger, than fill his stomach with the fruit of his beneficence. We may likewise observe, that the lion is not a cruel animal: he kills rather from necessity than choice, never destroying more than he eats; and whenever his appetite is satisfied, he is mild and peaceable. For his ordinary subsistence, he requires about 15 pounds of raw flesh each day.

The aspect of the lion corresponds with the noble and generous qualities of his mind. His figure is respectable; his looks are determined; his gait is stately, and his voice tremendous. In a word, the body of the lion appears to be the best model of strength

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joined to agility. The force of his muscles is expressed by his prodigious leaps and bounds, often 20 feet at once; by the brisk motion of his tail, a single sweep of which is sufficient to throw a man to the ground; by the ease with which he moves the skin of his face, and particularly of his forehead; and, lastly, by the faculty of erecting and agitating the hair of his mane when irritated.

Lions are very ardent in their amours: when the female is in season, she is often followed by eight or ten males, who roar incessantly, and enter into furious engagements, till one of them completely overcomes the rest, takes peaceable possession of the female, and carries her off to some secret recess. The lioness brings forth her young in the spring, and produces but once every year.

All the passions of the lion, the soft passion of love not excepted, are excessive; the love of offspring is extreme: the lioness is naturally weaker, less bold, and more gentle than the lion; but she becomes perfectly rapacious and terrible when she has young. Then she exhibits more courage than the male; she regards no danger; she attacks indifferently men and all other animals, kills them, and carries them to her young ones, whom she thus early instructs to suck their blood and tear their flesh. She generally brings forth in the most secret and inaccessible places; and, when afraid of a discovery, she endeavours to conceal the traces of her feet, by returning frequently on her steps, or rather by effacing them with her tail; and, when the danger is great, she carries off her young, and conceals them somewhere else. But, when an actual attempt is made to deprive her of her young, she becomes perfectly furious, and defends them till she be torn to pieces.

The lion seldom goes abroad in the middle of the day; but sallies forth in the evening and night in quest of prey. He is afraid of fire, and seldom or never approaches the artificial fires made by the shepherds for the protection of their flocks; he does not trace other animals by the scent, but is obliged to trust to his eyes. Many historians have even misrepresented him as incapable of finding out his prey; but that he is obliged to the jackal, an animal of exquisite scent, in order to provide for him, and that this animal either accompanies or goes before him for this purpose. The jackal is a native of Arabia, Libya, &c. and, like the lion, lives upon prey: perhaps sometimes he follows the lion, but it is with a view to pick up what he leaves behind, not to provide for him; for, being a small and feeble animal, he ought rather to fly from than to serve the lion.

The lion, when hungry, will attack any animal that presents itself; but he is so very formidable that all endeavour to avoid his rencounter; this circumstance often obliges him to conceal himself, and lie in wait till some animal chances to pass. He lies squat on his belly in a ticket; from which he springs with such force and velocity, that he often seizes them at the first bound. He endures hunger longer than thirst; he seldom passes water without drinking, which he does by lapping like a dog. In burning deserts, where rivers and fountains are denied, they live in a perpetual fever, a sort of madness fatal to every animal they

meet with. The author of the *Oeconomy of Nature* gives a wonderful proof of the instinct of these animals in those unwatered tracts. There the pelican makes her nest; and in order to cool her young ones, and accustom them to an element they must afterwards be conversant in, brings from afar, in their great gular pouch, sufficient water to fill the nest: the lion, and other wild beasts, approach and quench their thirst yet never injure the unfledged birds, as if conscious that their destruction would immediately put a stop to those grateful supplies.

The roaring of the lion, which is strong and loud, is his ordinary voice; but when he is irritated, his cry is shorter, repeated more suddenly, and is still more terrible than the roaring: besides, he beats his sides with his tail, stamps with his feet, erects and agitates the hair of his head and mane, moves the skin of his face, shows his angry teeth, and lolls out his tongue.

The roaring of the lion, according to Mr Sparman, "consists in a hoarse inarticulate sound, which at the same time seems to have a hollowness in it something like that proceeding from a speaking trumpet. The sound is between that of a German *u* and an *o*, being drawn to a great length, and appearing as if it came from out of the earth; at the same time that, after listening with the greatest attention, I could not exactly hear from what quarter it came. The sound of the lion's voice does not bear the least resemblance to thunder, as M. de Buffon, tom. ix. p. 22. from the Voyage of Boullaye le Gouz, affirms it does. In fact, it appeared to me to be neither peculiarly piercing nor tremendous; yet, from its slow prolonged note, joined with nocturnal darkness, and the terrible idea one is apt to form to one's self of this animal, it made one shudder, even in such places as I had an opportunity of hearing it with more satisfaction, and without having the least occasion for fear. We could plainly perceive by our cattle when the lions, whether they roared or not, were reconnoitering us at a small distance. For in that case the hounds did not dare to bark in the least, but crept quite close to the Hotrentots; and our oxen and horses sighed deeply, frequently hanging back, and pulling slowly with all their might at the strong straps with which they were tied up to the waggon. They likewise laid themselves down upon the ground and stood up alternately, appearing as if they did not know what to do with themselves: or rather just as if they were in the agonies of death. It is, indeed, a wonderful circumstance (continues our author), that the brute creation should have been taught merely by nature to be in dread of the lion; for our horses and oxen were all from places where I am certain they could have no knowledge of this dreadful adversary of theirs: so that in this we must admire the bounty of Providence, which, while it has sent such a tyrant as the lion amongst the animal creation, has likewise taught them to discern and distinguish it with trembling and horror."

The gait of the lion is stately, grave, and slow, tho' always in an oblique direction. His movements are not equal or measured, but consists of leaps and bounds; which prevent him from stopping suddenly, and makes him often overleap his mark. When he leaps upon his

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his prey, he makes a bound of 12 or 15 feet, falls above it, seizes it with his fore-feet, tears the flesh with his claws, and then devours it with his teeth. If he chances to miss his leap, he will not, as the Hottentots unanimously assured Mr Sparman, follow his prey any farther; but as though he were ashamed, turning round towards the place where he lay in ambush, slowly, and step by step, as it were, measures the exact length between the two points, in order to find how much too short of, or beyond, the mark he had taken his leap.

One would suppose that the roaring of the lion would prove serviceable to the other animals as being a warning for them to betake themselves to flight; but as when he roars, according to all report, he puts his mouth to the ground, so that the sound is diffused equally all over the place, without, as we have already mentioned, its being possible to hear from what quarter it comes, the animals are intimidated and scared to such a degree, as to fly about backwards and forwards in the dark to every side; in consequence of which, they often chance to run on to the very spot from whence the sound actually proceeds, and which they meant most to avoid.

Dr Sparman, in his account of the lion, detracts considerably from the character of courage and generosity generally ascribed to that animal. "It is not in magnanimity (says he), as many will have it to be, but in an insidious and cowardly disposition, blended with a certain degree of pride, that the general character of the lion consists; though hunger must naturally have the effect of now and then inspiring so strong and nimble an animal with uncommon intrepidity and courage. Moreover, being accustomed always itself to kill its own food, and that with the greatest ease, as meeting with no resistance, and even frequently to devour it reeking and weltering in its blood, it cannot but be easily provoked, and acquire a greater turn for cruelty than for generosity: but, on the other hand, not being accustomed to meet with any resistance, it is no wonder that, when it does, it should sometimes be faint-hearted and crest-fallen. A yeoman, a man of veracity (Jacob Kok, of Zeekoe-river), related to me an adventure he had in these words:—One day walking over his lands with his loaded gun, he unexpectedly met with a lion. Being an excellent shot, he thought himself pretty certain, in the position he was in, of killing it, and therefore fired his piece. Unfortunately he did not recollect, that the charge had been in it for some time, and consequently was damp; so that his piece hung fire, and the ball falling short, entered the ground close to the lion. In consequence of this he was seized with a panic, and took directly to his feet; but being soon out of breath, and closely pursued by the lion, he jumped up on a little heap of stones, and there made a stand, presenting the butt end of his gun to his adversary, fully resolved to defend his life as well as he could to the utmost. My friend did not take upon him to determine, whether this position and manner of his intimidated the lion or not: it had, however, such an effect upon the creature that it likewise made a stand; and what was still more singular, laid itself down at the distance of a few paces from the heap of stones seemingly quite unconcerned. The sportsman, in the mean while, did not dare to stir a step from the spot: besides, in his

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flight, he had the misfortune to lose his powder horn. At length, after waiting a good half hour, the lion rose up, and at first went very slowly, and step by step, as if it had a mind to steal off; but as soon as it got to a greater distance, it began to bound away at a great rate."

Our author also relates the following occurrence, as serving to show the cowardice and insidious disposition of the lion. "An elderly Hottentot in the service of a Christian, near the upper part of Sunday river on the Cambdebo side, perceived a lion following him at a great distance for two hours together. Thence he naturally concluded, that the lion only waited for the approach of darkness, in order to make him his prey: and in the mean time, could not expect any other than to serve for this fierce animal's supper, inasmuch as he had no other weapon of defence than a stick, and knew that he could not get home before it was dark. But as he was well acquainted with the nature of the lion, and the manner of its seizing upon its prey, and at the same time had leisure between whiles to ruminate on the ways and means in which it was most likely that his existence would be put an end to, he at length hit on a method of saving his life. For this purpose, instead of making the best of his way home, he looked out for a *kupkrans* (so they generally call a rocky place level and plain at top, and having a perpendicular precipice on one side of it), and sitting himself down on the edge of one of these precipices, he found to his great joy, that the lion likewise made a halt, and kept the same distance as before. As soon as it grew dark, the Hottentot sliding a little forwards, let himself down below the upper edge of the precipice upon some projecting part or cleft of the rock, where he could just keep himself from falling. But in order to cheat the lion still more, he set his hat and cloak on the stick, making with it at the same time a gentle motion just over his head, and a little way from the edge of the mountain. This crafty expedient had the desired success. He did not stay long in that situation, before the lion came creeping softly towards him like a cat, and mistaking the skin-cloak for the Hottentot himself, took his leap with such exactness and precision, as to fall headlong down the precipice, directly close to the snare which had been set up for him; when the Hottentot is said, in his great joy, exultingly to have called out *t'katsi!* an interjection of very extensive import and signification."

This is not the only instance of lions in Africa being ensnared in the midst of their leap. In the out-houses and waste grounds about farms, where a lion has been upon the watch for some animal and missed it, or where they have other reasons to expect him, they set up the figure of a man close up by the side of several loaded guns; so that these discharge themselves into the body of the beast at the very instant that he springs or throws himself upon the dressed figure. As this is done with so much ease and success, and as they hardly ever think it worth while in Africa to take lions alive, they seldom give themselves the trouble of catching them by means of pit-falls.

"It is singular (Dr Sparman remarks), that the lion, which, according to many, always kills his prey immediately if it belongs to the brute creation, is reported frequently, although provoked, to content himself

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The lion's strength, as already observed, is very great. Mr Sparman informs us, that "this animal

was once seen at the Cape to take an heifer in his mouth, and though the legs of this latter dragged on the ground, yet, seemed to carry her off with the same ease as a cat does a rat. It likewise leaped over a broad dike with her, without the least difficulty. A buffalo perhaps would be too cumbersome for this beast of prey, notwithstanding his strength, to seize, and carry off with him in the manner abovementioned. Two yeomen, upon whose veracity I can place some confidence, gave me the following account relative to this matter. Being a hunting near Boshiesman-river with several Hottentots, they perceived a lion dragging a buffalo from the plain to a neighbouring woody hill. They, however, soon forced it to quit its prey, in order to make a prize of it themselves; and found that this wild beast had had the sagacity to take out the buffalo's large and unwieldy entrails in order to be able the easier to make off with the fleshy and more eatable part of the carcase. The lion's strength, however, is said not to be sufficient alone to get the better of so large and strong an animal as the buffalo; but, in order to make it his prey, this fierce creature is obliged to have recourse both to agility and stratagem; insomuch, that stealing on the buffalo, it fastens with both its paws upon the nostrils and mouth of the beast, and keeps squeezing them close together, till at length the creature is strangled, wearied out, and dies. A certain colonist, according to report, had had an opportunity of seeing an attack of this kind; and others had reason to conclude that something of this nature had passed, from seeing buffaloes, which had escaped from the clutches of lions, and bore the marks of the claws of these animals about their mouth and nose. They asserted, however, that the lion itself risked its life in such attempts, especially if any other buffalo was at hand to rescue that which was attacked. It was said, that a traveller once had an opportunity of seeing a female buffalo with her calf, defended by a river at her back, keep for a long time at bay five lions which had partly surrounded her; but did not, at least as long as the traveller looked on, dare to attack her. I have been informed, from very good authority, that on a plain to the east of Kromme-river, a lion had been gored and trampled to death by a herd of cattle; having, urged probably by hunger, ventured to attack them in broad day-light." This the reader will, perhaps, not so much wonder at, when he is told, that in the day-time, and upon an open plain, 12 or 16 dogs will easily get the better of a large lion. Nor is there any necessity, Dr Sparman says, for the dogs with which the lion is to be hunted to be very large and trained up to the sport, as M. Buffon thinks they should be, the business being perfectly well accomplished with the common farm-house dogs. When these have got pretty near the lion, the latter, from a greatness of soul, does not offer to fly any farther, but sits himself down. The hounds then surround him, and rushing on him all at once, are thus, with their united strength, able to tear in pieces, almost in an instant, the strongest of all wild beasts. It is said, that he has seldom time to give more than two or three slight strokes with his paws (each of which strokes is instant death) to an equal number of his assailants. M. de Buffon asserts also, that the lion may be hunted on horseback, but that the horses as well as the dogs must

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must be trained to it. Dr Sparman, however, assures us, that the colonists hunt the lion with common hunting horses.

It is said, that horses in battle, or in other dangerous enterprises, suffer themselves more willingly to be caparisoned by their riders than at other times. This circumstance Dr. Sparman likewise remarked in these animals on the above expeditions. "Our horses (says he), the very same as had several times, in the manner abovementioned, shown their disquietude when the lion happened to be in the vicinity of them, and which were not in the least trained to the chase, once exhibited a spirit in the pursuit of two large lions, equal to that which they had shown at other times in chasing the timid gazels; though, in fact, hunting horses seem to partake much more of their master's pleasure in the chase. I remember, in particular, at Agter Bruntjes Hoogte, I rode a horse, which, by a tremulous sound issuing from its chest, cocking up its ears, and prancing and capering, discovered, in an unequivocal manner, its ardour for the chase, whenever it came in sight of the larger kind of game. There have even been instances of hunting horses, who, when the hunter has jumped off their backs in order to discharge his piece, but has missed his mark, have, in their eagerness for the chase, not allowed him time sufficient to mount again, but followed the game alone for hours together, close at its very heels, in all its turnings and windings."

The chase of the lion on horseback is carried on at the Cape in the following manner, as described by Dr Sparman.

"It is only on the plains that the hunters venture to go out on horseback in this chase. If the lion keeps in some coppice or wood, on a rising ground, they endeavour to seize it with dogs till it comes out; they likewise prefer going together two or more in number, in order to be able to assist and rescue each other, in case the first shot should not take place. When the lion sees the hunters at a great distance it is universally allowed, that he takes to his heels as fast as ever he can, in order to get out of their sight; but if they chance to discover him at a small distance from them, he is then said to walk off in a surly manner, but without putting himself in the least hurry, as though he was above showing any fear, when he finds himself discovered or hunted. He is therefore reported likewise, when he finds himself pursued with vigour, to be soon provoked to resistance, or at least he disdains any longer to fly. Consequently he slackens his pace, and at length only slides slowly off, step by step, all the while eying his pursuers askant; and finally makes a full stop, and turning round upon them, and at the same time giving himself a shake, roars with a short and sharp tone, in order to show his indignation, being ready to seize on them, and tear them in pieces. This is now precisely the time for the hunters to be upon the spot, or else to get as soon as possible within a certain distance of him, yet so as at the same time to keep a proper distance from each other; and he that is nearest, or is most advantageously posted, and has the best mark of that part of the lion's body which contains his heart and lungs, must be the first to jump off his horse, and securing the bridle by putting it round his arm, discharge his piece; then in an instant recover-

ing his seat, must ride obliquely athwart his companions; and, in fine, giving his horse the reins, must trust entirely to the speed and fear of this latter, to convey him out of the reach of the fury of the wild beast, in case he has only wounded him, or has absolutely missed him. In either of these cases, a fair opportunity presents itself for some of the other hunters to jump off their horses directly, as they may then take their aim and discharge their pieces with greater coolness and certainty. Should this shot likewise miss (which, however, seldom happens), the third sportsman rides after the lion, which at that instant is in pursuit of the first or the second, and, springing off his horse, fires his piece, as soon as he has got within a proper distance, and finds a sufficiently convenient part of the animal present itself, especially obliquely from behind. If now the lion turns upon him too, the other hunters turn again, in order to come to his rescue with the charge which they loaded with on horseback, while they were flying from the wild beast. No instance has ever been known of any misfortune happening to the hunters in chasing the lion on horseback. The African colonists, who are born in, or have had the courage to remove into the more remote parts of Africa, which are exposed to the ravages of wild beasts, are mostly good marksmen, and are far from wanting courage. The lion that has the boldness to seize on their cattle, which are the most valuable part of their property, sometimes at their very doors, is as odious to them as he is dangerous and noxious. They consequently seek out these animals, and hunt them with the greatest ardour and glee, with a view to exterminate them."

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II. The *Tigris*, or TIGER. The size of this animal, according to some authors, is larger, and, according to others, somewhat less, than the lion. M. de la Landemagon assures us, that he has seen a tiger in the East-Indies 15 feet long, including undoubtedly the length of the tail, which, supposing it to be four feet, makes the body of the tiger about 11 feet in length. The skeleton preserved in the cabinet of the French king, indicates that the animal was about seven feet long from the point of the muzzle to the origin of the tail; but then it must be considered, that he was caught young, and lived all his days in confinement. The head of the tiger is large and roundish; and the ears are short, at a great distance from each other. The form of the body has a great resemblance to that of the panther. The skin is of a darkish yellow colour, striped with long black streaks; the hair is short, excepting on the sides of the head, where it is about four inches long. The point of the tail is black, and the rest of it is interspersed with black rings. His legs and claws resemble those of the lion, only the legs are much shorter in proportion to the size of the animal.

Tiger.

The tiger is more ferocious, cruel, and savage than the lion. Although gorged with carnage, his thirst for blood is not appeased; he seizes and tears in pieces a new prey with equal fury and rapacity, the very moment after devouring a former one; he lays waste the country he inhabits; he neither dreads the aspect nor the weapons of men; puts to death whole troops of domestic animals; and attacks young elephants, rhinoceros's, and sometimes even braves the lion himself.

The

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The tiger seems to have no other instinct, but a constant thirst after blood, a blind fury which knows no bounds or distinction, and which often stimulates him to devour his own young, and to tear the mother in pieces, for endeavouring to defend them. He lies in wait on the banks of rivers, &c. where the heat of the climate obliges other animals to repair for drink. Here he seizes his prey, or rather multiplies his massacres; for he no sooner kills one animal, than he flies with equal fury upon the next, with no other view but to plunge in his head into their bodies and drink their blood. However, when he kills a large animal, as a horse or a buffalo, he sometimes does not tear out the entrails on the spot; but, to prevent any interruption, he drags them off to the wood, which he performs with incredible swiftness. This is a sufficient specimen of the strength of this rapacious animal.

Neither force, restraint, or violence, can tame the tiger. He is equally irritated with good as with bad treatment: he tears the hand which nourishes him with equal fury, as that which administers blows: he roars and is enraged at the sight of every living creature. Almost every natural historian agrees in this horrible character.

There is a sort of cruelty in their devastation, unknown to the generous lion; as well as a poltroonry in their sudden retreat on any disappointment. "I was informed (says Mr Pennant) by very good authority, that in the beginning of this century, some gentlemen and ladies, being on a party of pleasure, under a shade of trees, on the banks of a river in Bengal, observed a tiger preparing for its fatal spring; one of the ladies, with amazing presence of mind, laid hold of an umbrella, and furling it full in the animal's face, which instantly retired, and gave the company opportunity of removing from so terrible a neighbour. Another party had not the same good fortune; a tiger darted among them while they were at dinner, seized on one gentleman, and carried him off, and he never was more heard of." The tiger attacks all sorts of animals, even the lion; and it has been known that both have perished in their combats. There is in some parts of India a popular notion, that the rhinoceros and the tiger are in friendship, because they are often found near each other. But according to Mr Pennant, the fact is, that the rhinoceros, like the hog, loves to wallow in the mire; and on that account frequents the banks of rivers: the tiger, to quench its raging thirst, is met with in places contiguous to them.

Pliny has been frequently taken to task by the moderns, for calling the tiger *animal tremenda velocitatis*: they allow it great agility in its bounds, but deny it swiftness in pursuit. Two travellers of authority, however, both eye-witnesses, confirm what Pliny says: the one indeed only mentions in general its vast swiftness; the other saw a trial between one and a swift horse, whose rider escaped merely by getting in time amidst a circle of armed men. The chase of this animal was a favorite diversion with the great Cam-hi, the Chinese monarch, in whose company Mr Bell*, that faithful traveller, and the Pere Gerbillion, saw these proofs of the tiger's speed.

The tiger, according to Mr Pennant, is peculiar to Asia; and is found as far north as China and Chinese Tartary, and about lake Aral and the Altaic moun-

tain. It inhabits mount Ararat and Hyrcania, of old famous for its wild beasts; but the greatest numbers, the largest, and the most cruel, are met with in India and its islands. In Sumatra, the natives are so infatuated that they seldom kill them, having a notion, that they are animated by the souls of their ancestors.

The tiger has always been a more rare animal than the lion; and yet brings forth an equal number of young, namely, four or five at a litter. The female is furious at all times; but when her young are attempted to be taken from her, her rage is redoubled: she braves every danger; she pursues the ravishers, who are obliged, when hard pressed, to drop one of the young in order to retard her motion; she stops, takes it up, and carries it into some secret part of the forest; but instantly returns and pursues the hunters into their villages or boats.

The tiger moves the skin of his face, grinds his teeth, and roars, like a lion; but the sound of his voice is different.

III. The *Pardus*, or PANTHER.—It is about the size of a large dog, and has a great resemblance to a domestic cat. The tongue is rough, and remarkably red; the teeth are strong and sharp; the skin is exceedingly beautiful, being of a yellow colour, variegated with roundish black spots, and the hair is short. It has a cruel and ferocious aspect; his motions are brisk and lively: his cry resembles the growl of an enraged dog, but is more strong and rough.

The panther inhabits Africa, from Barbary to the remotest parts of Guinea. This species is next in size to the tiger; next to it in cruelty, and in its general enmity to the animal creation; it is to Africa what the former is to Asia, with this alleviation, that it prefers the flesh of brutes to that of mankind; but when pressed with hunger, attacks every living creature without distinction. Its manner of taking its prey is the same with that of the tiger, always by surprise, either lurking in thickets or creeping on its belly till it comes within reach: it will also climb up trees in pursuit of monkeys and lesser animals; so that nothing is secure from its attacks. He is not so perfectly ungovernable as the tiger: but, notwithstanding all attempts to render him obedient and tractable, he may rather be said to be subdued than tamed; for he never entirely loses his natural ferocity. Accordingly, when kept with a view to the hunting of bucks, goats, or other animals, great care is necessary in training him, and still greater in conducting him. When leading out to the field, they put him in a cage and carry him in a cart. When the game is sprung, they open the door of the cage; he instantly springs towards the animal, often seizes him in a few bounds, throws him to the ground, and strangles him. But, if he happens to miss his aim, he becomes mad with rage, and sometimes falls upon his master, who, in order to prevent accidents of this kind, generally carries along with him pieces of flesh, or perhaps a lamb or a kid, which he throws to him in order to appease his fury.

The ancients were well acquainted with these animals. These, and the leopards, were the *Varia* and *Pardi* of the old writers: one should think that the Romans would have exhausted the deserts of Africa by the numbers they drew from thence for their public shows. Scaurus exhibited at one time 150 panthers;

Pompey

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Panther.

* *Travels*,
vol. II. p. 91.

Domestic Cat.



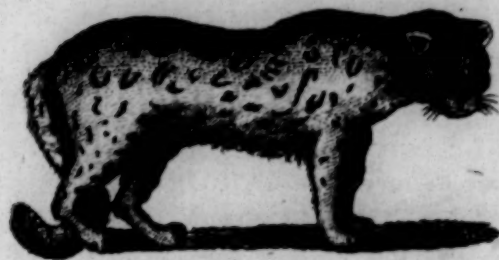
Spanish Cat.



Angora Cat.



Ounce.



Lynx.



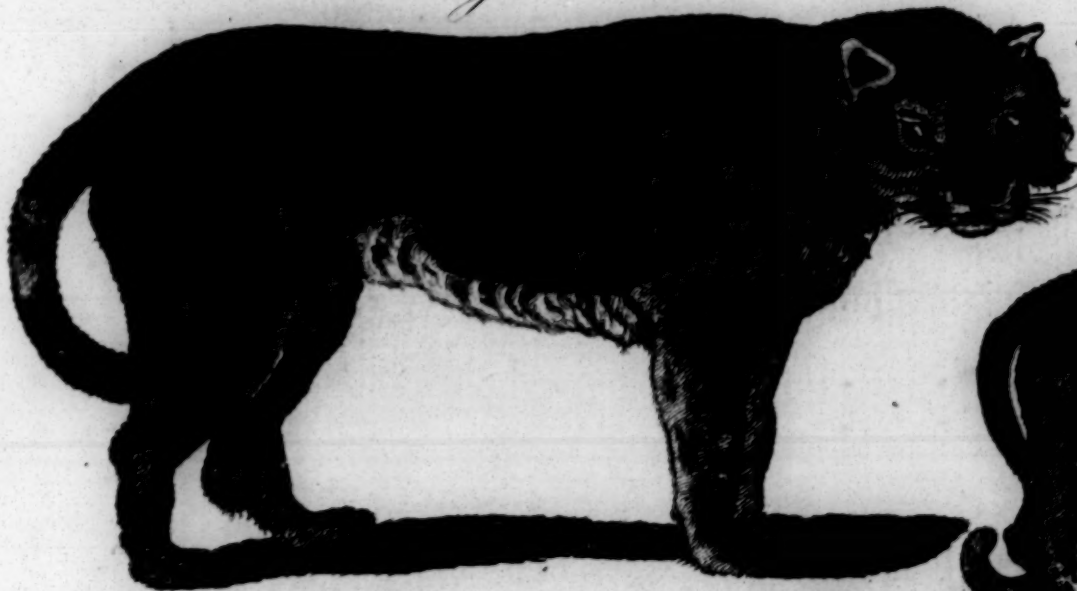
Wild Cat.



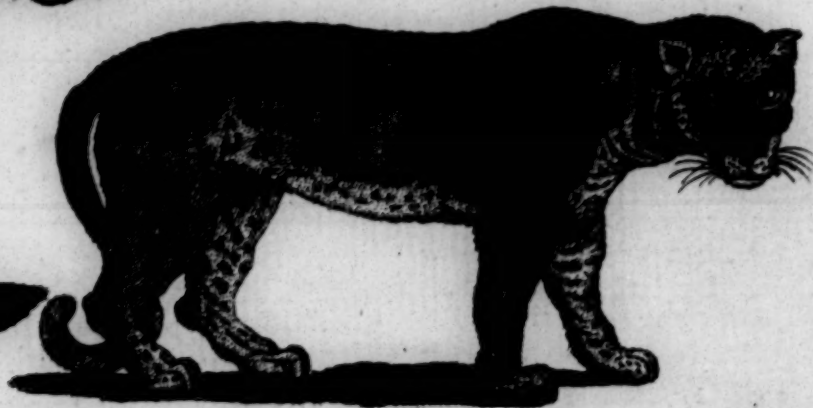
Leopard.



Tiger.



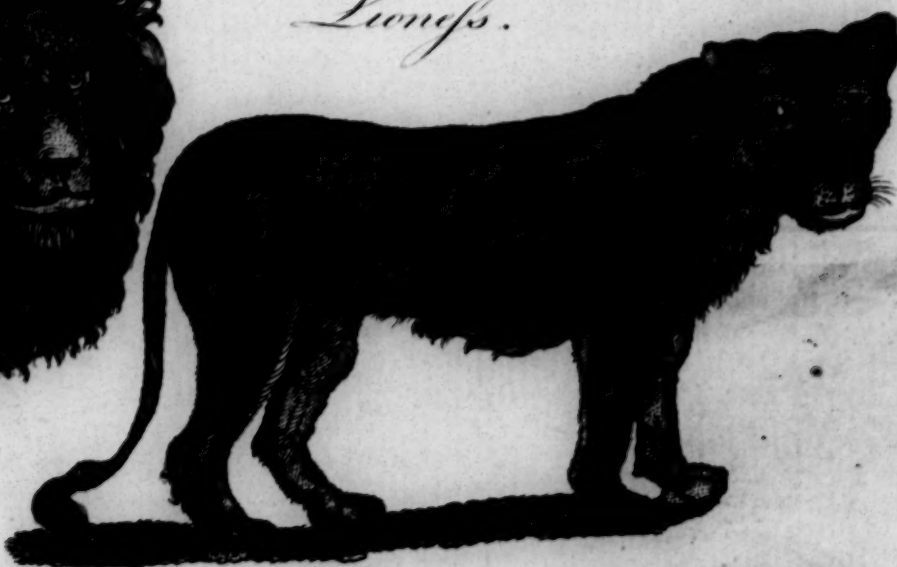
Panther.



Lion.



Lioness.



J. Bonchard sculp.



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Pompey the Great, 410; Augustus, 420. Probably they thinned the coasts of Mauritania of these animals, but they still swarm in the southern parts of Guinea.—Oppian describes two species of panthers, a large species and a small one; the first of which has a shorter tail than the lesser, and may possibly be this kind.—An animal of this species is found in Buckharia, called there *Babr*: it is seven feet long, very destructive to horses, and even camels; the skin is fine, and valued in Russia at 1 l. Sterling.—In China there is a most remarkable kind, called there *Loucku*, whose skins sell at 6 l. Sterling a-piece. It must here also be observed, that there are in the furriers shops in London, skins in most respects resembling those of the panther; which, they assure us, come from the Spanish settlements in the West-Indies: These skins equal those of the old continent in beauty and size.

Though M. Buffon denies the panther to be an inhabitant of America, yet Mr Pennant is of opinion that the same, or a variety at least, inhabits that country. 1. The figure of the species described by Faber, (*Hist. An. Nov. Hisp.* p. 498) under the name of *Tigris Mexicana*, agrees exactly with that of the panther, as does also the description in general. 2. Every other animal of this genus, which has yet been discovered in America, is far inferior in size and strength to this; whose common height, Faber says, is four or five feet, and whose prey is wild cattle, horses, &c. *M. Condamine*, and *Le Pere Cajetan Cattaneo*, speak of the tigers (*i. e.* the panthers) of America, as equal and even superior in size to those of Africa, and the colour as bright as gold; and Ulloa describes them as big as little horses. 3. Notwithstanding the venders of furs are not entirely to be relied on as to the countries their goods come from, yet the general opinion of the whole trade, that these skins were the product of Spanish America, is a further proof of their being common to both continents.

Once.

IV. The *Uncia*, or ONCE, is less than the panther; the tail is longer; the hair is likewise longer, and of a whitish grey colour. The once is easily tamed; and is employed in hunting in several parts of Asia, where dogs are very scarce. He has not the delicate scent of a dog; does not trace other animals by the smell; neither can he run them down in a fair chase; but lies in wait for their approach, and then darts upon them unawares. He leaps so nimbly, that he easily clears a ditch or a wall several feet high: besides, he often climbs trees, waits till some animal passes, and instantly leaps upon them. This method of catching their prey, is practised by the panther and leopard, as well as by the once.—The once inhabits Barbary, Persia, Hyrcania, and China; from which last place the skins are brought into Russia, and sold for 20s. a piece. It is an animal of a more gentle and mild nature than most of the preceding. It is, like the next species, used for the chase of antelopes, and even hares; but, instead of being conveyed in a waggon, is carried on the crupper on horseback. It is under as much command as a setting-dog; returns at the least call, and jumps up behind its master. This animal is supposed to be the lesser panther of Oppian, and the panthera of Pliny.

Leopard.

V. The *Leopardus*, or LEOPARD, differs from the panther and the once, in the beauty of his colour, which is a lively yellow, with smaller spots than those

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of the two latter, and disposed in groups. He is larger than the once, and less than the panther. He inhabits Senegal and Guinea; and spares neither man nor beast. When beasts of chase fail, the leopards descend from the internal parts of Africa in crowds, and make great havock among the numerous herds that cover the rich meadows of the lower Guinea. It tears its prey to pieces with both claws and teeth; but is always thin, though perpetually devouring.—The panther is its enemy, and destroys numbers of them. The negroes make collars of their teeth, and attribute to them certain virtues. The negroes take these animals in pit-falls, covered at the top with slight hurdles, on which is placed some flesh as a bait. They make a banquet of their flesh, which is said to be as white as veal, and very well tasted. Leopards skins are often brought to Europe, and reckoned very valuable. In Asia these animals are found in the mountains of Caucasus, from Persia to India; and also in China, where they are called *Poupi*. By the Bucharian traders, who often bring their skins to Russia, they are styled *Bars*. The leopard inhabits also Arabia, where it is called *Nemr*. We are informed by Mr Forskal, that in that country, as well as in Egypt, it will do no harm to man unless provoked; but will enter houses by night, and destroy the cats.

Felis.

VI. The *Onca*, or American Tiger, (the JAGUAR of Buffon), is of a bright tawny colour; the top of the back marked with long stripes of black; the sides with rows of irregular oblong spots; open in the middle, which is of the ground-colour of the hair: the thighs and legs are marked with full spots of black, the breast and belly whitish: the tail not so long as the body. This species, which grows to the size of a wolf, and even larger, inhabits the hottest parts of South-America, from the isthmus of Darien to Buenos Ayres. It is fierce, and destructive to man and beast. Like the tiger, it plunges its head into the body of its prey, and sucks out the blood before it devours it. It makes a great noise in the night, like the howling of a hungry dog; and is a very cowardly animal. It is easily put to flight, either by the shepherd dogs, or by a lighted torch, being very fearful of fire. It lies in ambush near the sides of rivers; and there is sometimes seen a singular combat between this animal and the crocodile. When the jaguar comes to drink, the crocodile, ready to surprise any animal that approaches, raises its head out of the water; upon which the former instantly strikes its claws into the eyes of this dreadful reptile, the only penetrable part, who immediately dives under the water, pulling his enemy along with it, where they commonly both perish.

Jaguar.

VII. The *Pardalis*, Mexican panther, or the OCELOT of Buffon, has its head, back, upper part of the rump, and tail, of a bright tawny; a black stripe extending along the top of the back, from head to tail; and from the nostrils to the corners of the eyes, there also runs a stripe of black; the sides are whitish, marked lengthways with long stripes of black, hollow and tawny in the middle, in which are sprinkled some small black spots; the legs are whitish, varied with small black spots; and the tail is also varied with small spots near its base, and larger near the end, which is black. It is above four times the size of a large cat, and

Ocelots

B b

strongly

Felis.

strongly made. It inhabits Mexico, the neighbourhood of Carthage, and Brasil. It lives in the mountains; and is very voracious, but fearful of mankind; preying on young calves, and different sorts of game. It lurks amidst the leaves of trees; and sometimes will extend itself along the boughs as if dead, till the monkeys, tempted by their natural curiosity, approaching to examine it, become its prey.

Hunting
Leopard.

VIII. The *Jubata*, or HUNTING LEOPARD, (*Cuepard Buff.*) is of the size of a large greyhound, of a long make, with a narrow chest and long legs. The colour of the body is a light tawny brown marked with numbers of small round black spots; the neck is shaggy, and the tail is longer than the body. It inhabits India; where it is tamed, and trained for the chase of antelopes. For this purpose it is carried in a small kind of waggon, chained and hoodwinked, till it approaches the herd: when first unchained, it does not immediately make its attempt, but winds along the ground, stopping and concealing itself till it gets a proper advantage, and then darts on the animals with surprising swiftness. It overtakes them by the rapidity of its bounds; but if it does not succeed in its first efforts, consisting of five or six amazing leaps, it misses its prey: losing its breath, and finding itself unequal in speed, it stands still, gives up the point for that time, and readily returns to its master. This species is called in India, *Chittah*. It is used for the taking of jackals, as well as other animals.

Black Ti-
ger.

IX. The *Discolor*, or BLACK TIGER, (*Cougar Noir, Buff.*), is covered with short very glossy hairs of a dusky colour; the throat, belly, and inside of the legs, white. It grows to the size of a heifer of a year old, and has vast strength in its limbs. It inhabits Brasil and Guiana; and is a cruel and fierce beast, but happily is a scarce species.

Puma.

X. The *Concolor*, or PUMA (*Cougar, Buff.*) has a very small head, ears a little pointed, and eyes large. The back, neck, rump, sides, are of pale brownish red, mixed with dusky hairs; the breast, belly, and inside of the legs, cinereous. The tail is dusky and ferruginous, the tip black; and the teeth are of a vast size. It is long bodied, and high on its legs; the length from nose to tail five feet three inches, of the tail two feet eight. This animal inhabits the continent of America, from Canada to Brasil: in South America is called *Puma*, and by Europeans mistaken for the lion. It is the scourge of the colonies of the hotter parts of America, being fierce and ravenous to the highest degree. It swims over the broad rivers; attacks the cattle in the very inclosures; and when pressed with hunger, spares not even mankind. In North America their fury seems to be subdued by the rigor of the climate; and the smallest cur, in company with its master, makes them seek for security, by running up trees: but then they are equally destructive to domestic animals, and are the greatest nuisance the planter has; when they lay in wait for the moose, or other deer, they lie close on the branch of some tree till the animal passes beneath, when they drop upon and soon destroy them. They also make wolves their prey: In the Museum of the Royal Society, there is the skin of one which was killed just as it had pulled down a wolf. When it has satisfied itself with eating, it carefully conceals the rest of the carcase, covering it with

leaves: if any other touches the relics, it never comes near them again. It sometimes purrs like a cat, and at other times makes a great howling. The fur is soft, and of some value among the Indians, who cover themselves with it during winter; and who also eat the flesh, which is said to be as good and as white as veal.

Felis.

Margay.

XI. The *Tigrina*, or MARGAY of Buffon, is about the size of a common cat. The upper part of the head, the neck, back, sides, shoulders, and thighs, are of a bright tawny-colour: the face is striped downwards with black: the shoulders and body are marked with stripes and oblong large black spots; the legs with small spots; the thighs are whitish, spotted with black: The tail is very long, marked with black, tawny and grey. It inhabits South America, where it lives on the feathered game and on poultry. It is untameable. It makes a noise like the common cat; lives much in trees; is very active, and goes by bounds or leaps. It brings forth in all seasons of the year, in hollow trees, and has two at a time.

XII. The *Capensis*, Cape-Tiger, or TIGER-CAT of the Cape, is the *Nsuffi* of Labat, who was the first who noticed this species, which he describes as "of the size of a dog, with a coat as much striped and varied as that of a tiger. Its appearance bespeaks cruelty, and its eyes fierceness; but it is cowardly, and gets its prey only by cunning and insidious arts." All these characters are perfectly applicable to the Cape cat; and it seems the animal is found in all parts of Africa, from Congo to the Cape of Good Hope, in an extent of country of about eleven degrees of latitude. Kolben also speaks of a tiger bush-cat, which he describes as the largest of all the wild-cats of the Cape countries, and as spotted something like a tiger. A skin of this animal was seen by Mr Pennant in a furrier's shop in London, who thought it came from the Cape of Good Hope; from this skin Mr Pennant gave the first description which could be of any utility to a natural historian. All the other authors mention this animal in a vague manner. When Dr Forster touched the second time at the Cape of Good Hope in the year 1775, an animal of this species was offered him to purchase; but he refused buying it because it had a broken leg, which made him apprehensive of losing it by death during the passage from the Cape to London. It was very gentle and tame. It was brought in a basket to his apartment, where he kept it above 24 hours; which gave him the opportunity of describing it more accurately than had hitherto been done, and of observing its manners and economy. These he found to be perfectly analogous to those of our domestic cats. It ate fresh raw meat, and was very much attached to its feeders and benefactors: tho' it had broke the fore leg by accident, it nevertheless was very easy. After it had been several times fed by our author, it soon followed him like a tame favourite cat. It liked to be stroked and caressed; it rubbed its head and back always against the person's cloaths who fed it, and desired to be made much of. It purred as our domestic cats do when they are pleased. It had been taken when quite young in the woods, and was not above eight or nine months old; but had already very nearly, if not quite, attained its full growth. The Doctor was told, that the tiger-cats live in mountainous and woody tracts; and that in

Felis.

in their wild state they are very great destroyers of hares, rabbits, yerbuas, young antelopes, lambkins, and of all the feathered tribe. A very particular technical description of this species is given in the Phil. Transf. vol. lxxi. p. 4. with a figure, which the reader will see copied among other species in our plates.

Cat.

XIII. The *Catus*, or CAT.

1. The *ferus*, or wild cat, is three or four times as large as the house cat; the head larger, and the face flatter. The teeth and claws are tremendous: its muscles very strong, as being formed for rapine: the tail is of a moderate length, but very thick, marked with alternate bars of black and white, the end always black: the hips and hind part of the lower joints of the leg are black: the fur is very soft and fine. The general colour of these animals is of a yellowish white, mixed with a deep grey: these colours, though they appear at first sight confusedly blended together, yet on a close inspection will be found to be disposed like the streaks on the skin of the tiger, pointing from the back downwards, rising from a black list that runs from the head along the middle of the back to the tail.

This animal, may be called the *British tiger*. It is the fiercest and most destructive beast they have; making dreadful havock among poultry, lambs, and kids. It inhabits the most mountainous and woody parts of Britain, living mostly in trees, and feeding only by night. It multiplies as fast as our common cats; and often the females of the latter will quit their domestic mates, and return home pregnant by the former.

They are taken either in traps or by shooting: in the latter case, it is very dangerous only to wound them: for they will attack the person who injured them, and have strength enough to be no despicable enemy. Wild cats were formerly reckoned among the beasts of chase; as appears by the charter of Richard II. to the abbot of Peterborough, giving him leave to hunt the hare, fox, and wild cat. The use of the fur was in lining of robes: but it was esteemed not of the most luxurious kind; for it was ordained, "that no abbess or nun should use more costly apparel than such as is made of lamb's or cat's skins." In much earlier times it was also the object of the sportsman's diversion.

This animal is the stock or origin of the domestic cat in all its varieties.—It inhabits the woods of most parts of Europe, but none are found in the vast woods of Russia or Siberia. It dwells with the common lynx in all the wooded parts of the mountains of Caucasus and their neighbourhood; and is most destructive to lambs, kids, fawns, and to all sorts of feathered game.

2. The *domesticus*, or tame cat, is so well known, that it requires no description. It is an useful, but deceitful domestic. Although when young they are playful and gay, they possess at the same time an innate malice and perverse disposition, which increases as they grow up, and which education learns them to conceal, but never to subdue. Constantly bent upon theft and rapine, though in a domestic state, they are full of cunning and dissimulation; they conceal all their designs; seize every opportunity of doing mischief, and then fly from punishment. They easily take on the habits of society, but never its manners; for they have only the appearance of friendship and attachment. This disin-

Felis.

genuity of character is betrayed by the obliquity of their movements and the ambiguity of their looks. In a word, the cat is totally destitute of friendship; he thinks and acts for himself alone. He loves ease, searches for the softest and warmest places to repose himself. The cat is likewise extremely amorous; and, which is very singular, the female is more ardent than the male: she not only invites, but searches after and calls upon him to satisfy the fury of her desires; and, if the male disdains or flies from her, she pursues, bites, and in a manner compels him. This heat of passion in the females lasts but nine or ten days, and happens twice in the year, namely, in the spring and autumn; however, in some it happens thrice or four times in the year. The female goes with young 55 or 58 days, and generally produces four or five at a litter. As the male has an inclination to destroy the young, the female takes care to conceal them from him; and, when she is apprehensive of a discovery, she takes them up in her mouth one by one, and hides them in holes or inaccessible places. When she has nursed a few weeks, she brings them mice, small birds, &c. in order to learn them to eat flesh. But it is worth notice, that these careful and tender mothers sometimes become unnaturally cruel, and devour their own offspring.

The cat is incapable of restraint, and consequently of being educated to any extent. However, we are told, that the Greeks in the island of Cyprus trained this animal to catch and devour serpents, with which that island was greatly infested. This, however, was not the effect of obedience, but of a general taste for slaughter; for he delights in watching, attacking, and destroying all kinds of weak animals indifferently. He has no delicacy of scent, like the dog; he hunts only by the eye; neither does he properly pursue; he only lies in wait, and attacks animals by surprise; and after he has caught them, he sports with and torments them a long time, and at last kills them (when his belly is full), purely to gratify his sanguinary appetite.

The eye of the cat differs greatly from that of most other animals. The pupil is capable of a great degree of contraction and dilatation. It is narrow and contracted like a line during the day, round and wide in the dark. It is from this conformation of the eye that the cat sees best in the night, which gives him a great advantage in discovering and seizing his prey.

Although cats live in houses, they can hardly be called *domestic* animals; they may rather be said to enjoy full liberty; for they never act but according to their own inclination. Besides, the greatest part of them are half wild; they do not know their masters; and frequent only the barns, out-houses, &c. unless when pressed with hunger.

Cats have a natural antipathy at water and cold. They likewise hate bad smells; but they have an affection for certain aromatic smells, and are transported with the root of the valerian.

Cats take about 18 months before they come to their full growth; but they are capable of propagation in 12 months, and retain this faculty all their life, which generally extends to nine or ten years. They eat slowly, and are peculiarly fond of fish. They drink frequently; their sleep is light; and they often assume the appearance of sleeping, when in reality they are meditating mischief. They walk softly, and without making any

Felis.

noise. As their hair is always dry, it easily gives out an electrical fire, which becomes visible when rubbed across in the dark. Their eyes likewise sparkle in the dark like diamonds.—The cat, when pleased, purrs, and moves its tail: when angry, it spits, hisses, and strikes with its foot. It washes its face with its fore-foot (Linnæus says at the approach of a storm): it always lights on its feet: it is even proverbially tenacious of life.

Our ancestors seem to have had a high sense of the utility of this animal. That excellent prince *Hoel dda*, or Howel the Good, did not think it beneath him (among his laws relating to the prices, &c. of animals*), to include that of the cat; and to describe the qualities it ought to have. The price of a kitten before it could see was to be a penny; till it caught a mouse, two-pence; when it commenced mouser, four pence. It was required besides, that it should be perfect in its senses of hearing and seeing, be a good mouser, have the claws whole, and be a good nurse: but if it failed in any of these qualities, the seller was to forfeit to the buyer the third part of its value. If any one stole or killed the cat that guarded the prince's granary, he was to forfeit a milch-ewe, its fleece and lamb; or as much wheat as, when poured on a cat suspended by its tail (the head touching the floor), would form a heap high enough to cover the tip of the former. This last quotation is not only curious, as being an evidence of the simplicity of ancient manners, but it almost proves to a demonstration, that cats are not aborigines of Britain, or known to the earliest inhabitants. The large prices set on them (if we consider the high value of specie at that time †), and the great care taken of the improvement and breed of an animal that multiplies so fast, are almost certain proofs of their being little known at that period.

b, The Angorensis, or cat of Angora, with hair of a silvery whiteness and silky texture, and very long, especially about the neck, where it forms a fine ruff. It is a large variety; found about Angora, the same country which produces the fine-haired goat. It degenerates after the first generation in our climate. A variety of this kind is found in China with pendent ears, of which the Chinese are very fond, and ornament their necks with silver collars. They are cruel enemies to rats, and supposed to be the domestic animals with the Chinese call *sumxi*.

c, The Hispanicus, or tortoise-shell cat, has the hair varied with black, white, and orange.

d, The Cæruleus, or blue cat, a variety of a dun colour, or greyish black. It is much cultivated in Siberia on account of its fine fur: but was brought there, as well as the other domestic kinds, by the Russians.

e, The Ruber, or wild red cat of Kolben, has a streak of bright red running along the ridge of the back to the tail, and losing itself in the grey and white on the sides. The skins are said to give ease in the gout, and are much valued on that account at the Cape.

Manul.

XIV. The MANUL, with the tail longer than that of the domestic cat, beset thickly with hair, and of an equal thickness in all parts; encircled with ten black rings, the three next to the tip almost touching one another, the rest more remote. It is about the size of a fox. The limbs are very robust; in which, and in colour, this animal greatly resembles a lynx, afterwards

described. It inhabits all the middle part of northern Asia, from the Yaik, or Ural as it is now called, to the very Amur. It loves open, woodless, and rocky countries, and preys on the lesser quadrupeds.

XV. The LYNX is about 2½ feet long and 15 inches high. He has a great resemblance to the common cat; but his ears are longer, and his tail is much shorter: his hair is streaked with yellow, white, and black colours. The lynx inhabits the vast forests of the north of Europe, Asia, and America. His eyes are brilliant, his aspect is soft, and his air is gay and sprightly. Like the cat, he covers his urine with earth; he howls something like the wolf, and is heard at a considerable distance; he does not run like the dog or wolf, but walks and leaps like a cat; he pursues his prey even to the tops of trees; neither wild cats nor squirrels can escape him; he lies in wait for flags, goats, hares, &c. and darts suddenly upon them; he seizes them by the throat and sucks their blood, then opens the head and eats the brain; after this, he frequently leaves them, and goes in quest of fresh prey. The colour of his skin changes according to the season or the climate; the winter furs are more beautiful than those of summer. These furs are valuable for their softness and warmth: numbers are annually exported from North America, and the north of Europe and Asia; the farther north and east they are taken, the whiter they are, and the more distinct the spots. Of these the most elegant kind is called *irbys*, whose skin sells on the spot for one pound Sterling. The ancients * celebrated the great quickness of the lynx's sight; and feigned that its urine was converted into a precious stone.

Felis.

Lynx.

* Plin.
viii. 8.
xxviii. 8.

XVI. The SERVIAL, has the upper part of the body of a dusky colour, interspersed with round black spots; the belly, and the orbits of the eye, are white. This animal, which is very fierce and untameable, inhabits the woods in the mountainous parts of India; where it lives in trees, and breeds in them. It scarcely ever descends on the ground; but leaps with great agility from tree to tree. It is called by the natives of Malabar the *maraputé*, by the Portuguese the *serval*.

Serval.

XVII. The CHAUS, or Caspian Lynx, has a round head, a little more oblong than that of the common cat; shining restless eye, with a most brilliant golden pupil: ears erect, oval, and lined with white hairs, their outside reddish, their summits tufted with black. The hairs are coarser than those of the cat or common lynx, but less so than those of the wolf. They are shortest on the head, but on the top of the back are above two inches long. The colour of the head and body is a yellowish brown: the breast and belly of a bright brown nearly orange. The tail reaches only to the flexure of the leg; is thick and cylindric; of the same colour with the back, tipped with black, and thrice obscurely annulated with black near the end. In general appearance it has the form of the domestic cat. Its length is 2½ feet from the nose to the base of the tail: its tail little more than 11 inches: its height before is 19 inches; behind, 20. It is sometimes found larger, there being instances of its reaching the length of 3 feet from the nose to the tail. This animal, which has been but lately discovered, inhabits the reeds and woods in the marshy parts that border on the western sides of the Caspian Sea, particularly about the castle Kassar on the river

Chaus.

Terek

Blue Cat.



Serval.



Siberian Lynx.



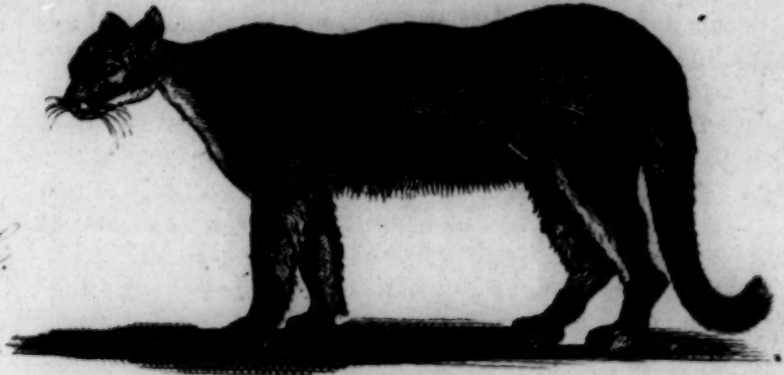
Tiger Cat.



Margay.



Puma.



Siyah Ghush.



Mountain Cat.



Bay Lynx. Canadian Lynx.



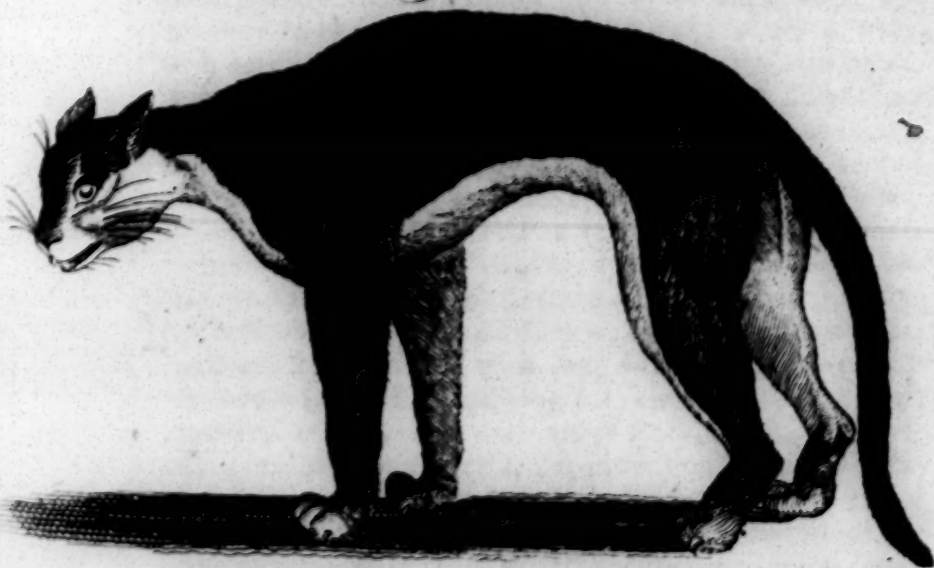
Hunting Leopard.



Ocelot.



Jaguar.

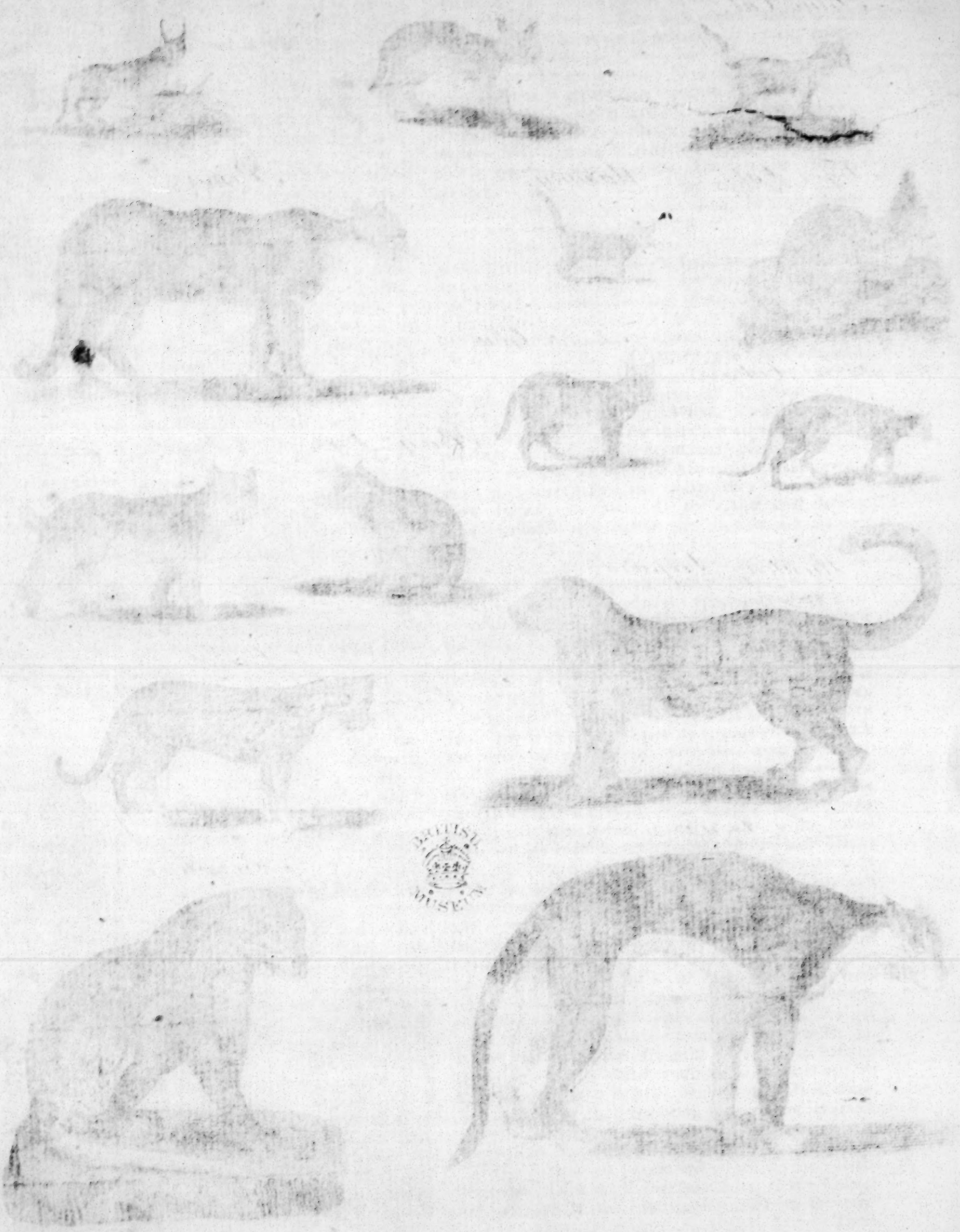


Brasilian Panther.



PLATE I

PLATE II



Felis.

Terek, and in the Persian provinces of Ghilan and Masfenderan, and frequently about the mouth of the Kur, the ancient Cyrus.—In manners, voice, and food, it agrees with the wild cat. It conceals itself in the day, and wanders over the flooded tracks in search of prey; feeding on rats, mice, and birds, but seldom climbing trees. It is excessively fierce, and never frequents the haunts of mankind. It is so impatient of captivity, that one which was taken in a trap, and had a leg broken, refused for many days the food placed by it; but in its fury devoured the fractured limb, with pieces of the stake it was fastened to, and broke all its teeth in the phrensy of its rage.

Sivah
Ghush.

XVIII. The *Caracal*, SIVAH GHUSH, or Persian Lynx, with a lengthened face and small head; very long, slender ears, terminated with a long tuft of black hairs; eyes small: the upper part of the body is of a very pale reddish brown; and the belly and breast are whitish: the limbs are strong and pretty long; and the tail is about half the length of the body. These animals inhabit Persia, India, and Barbary; where they are often brought up tame, and used in the chase of lesser quadrupeds, and the larger sort of birds, such as cranes, pelicans, peacocks, &c. which they surprise with great address. When they seize their prey, they hold it fast with their mouth, and lie for a time motionless on it. They are said to attend the lion, and to feed on the remains of the prey which that animal leaves. They are fierce when provoked; Dr Charleton says, he saw one fall on a hound, which it killed and tore to pieces in a moment, notwithstanding the dog defended itself to the utmost.—The Arabian writers call it *anak el ard*; and say, that it hunts like the panther, jumps up at cranes as they fly, and covers its steps when hunting.

Libyan
Lynx.

The LIBYAN LYNX is a variety with short black tufts to the ears, which are white within, and of a lively red without; the tail white at the tip, annulated with four black rings, with black marks behind the fore legs. It is greatly inferior in size to the former; not larger than a common cat. It inhabits both Libya and Barbary.

Bay Lynx.

XIX. The *Rufa*, or BAY LYNX, with a short tail, yellow irides, and upright sharp-pointed ears, tufted with long black hairs: the colour of the head, back, sides, and exterior parts of the legs, bright bay, obscurely marked with dusky spots: from beneath each eye certain long black stripes, of an incurvated form, mark the cheeks; which, with the upper and under lip, whole underside of the body, and insides of the legs, are white: the upper part of the tail is barred with dusky strokes; and next the end, one of a deep black; its tip and under side are white. This animal, which is about twice the bigness of a large cat, inhabits the inner parts of the state of New-York.

Canadian
Lynx.

XX. The CANADIAN LYNX, with pale yellow eyes, and erect ears tufted with long black hair. The body is covered with soft and long fur, cinereous tinged with tawny, and marked with dusky spots, more or less visible in different subjects, dependent on the age or season in which the animal is killed: the legs are strong and thick; the claws large. It is about three times the size of a common cat; the tail is only four inches long, tipped with black. This species inhabits the vast forests of North-America. It is called in Canada *le chat-cervier*,

or *le loup-cervier*, on account of its being so destructive to deer; which it drops on from the trees, like the puma, and fixing on the jugular vein, never quits its hold till the exhausted animal falls through loss of blood. The English call it a *wild cat*. It is very destructive to their young pigs, poultry, and all kind of game. The skins are in high esteem for the softness and warmth of the fur; and great numbers are annually exported into Europe.

Felis
||
Felo.

XXI. The *Mountain Lynx*, or CAT-A-MOUNTAIN, Cat-a-mountain. upright pointed ears, marked with two brown bars; with the head and upper part of the body of a reddish brown, with long narrow stripes of black; the sides and legs with small round spots: the chin and throat are of a clear white; the belly of a dull white. The length of the animal from nose to tail, is two feet and an half; of the tail, eight inches. It inhabits North America; and is said to be a gentle animal, and to grow very fat.

FELL (Dr John), a very learned English divine and bishop, entered a student at Christ-church, Oxford, 1636. In 1648, he was ejected by the parliamentary visitors, being then in holy orders: and from that time till the restoration lived at Oxford a retired and studious life. He was installed canon of Christ-church, July 1660; and the year following, dean of that church; in which place he did great services to the college, and reformed several abuses. He was consecrated bishop of Oxford in 1675; and had leave to hold his deanry in *commendam*, that he might continue his services to the college and university. He published several works and died in 1686.

FELLING of TIMBER.—Many circumstances are well known and constantly observed in the felling of timber for building, which, though to a hasty observer they might appear trifling, yet prove, on experience, to be of the utmost consequence. One thing observed by M. de Buffon, which very greatly increases the solidity and strength of timber, is, that the trees intended to be felled for service should first be stripped of their bark, and suffered to stand and die upon the spot before the cutting. The sappy part or blea of the oak, becomes by this means as hard and firm as the heart; and the real strength and density of the wood has been proved, by many experiments, to be greatly increased by it; nor is this a practice of any detriment to the proprietor, since the remaining stumps of these trees send up their young shoots as vigorously as if they had been cut down in their natural condition.

When any tree is to be cut down for timber, the first thing to be taken care of is a skilful disbranching of such limbs as may endanger in its fall: many trees are utterly spoiled for want of a previous care of this kind. In arms of timber that are very great, it is always necessary to chop or sink in them close to the bole, and then meeting it with down-right strokes, it will be severed from the tree without splitting. In felling the tree, take care always to cut it as close to the ground as possible, unless it is intended to be grubbed up: and the doing that is of advantage both to the timber and to the wood; for timber is never so much valued, if it be known to grow out of old stocks.

FELLOWSHIP, COMPANY, or *Distributive-Portion*, in arithmetic. See ARITHMETIC, n° 15.

FELO DE SE, in law, a person that lays deliberately

Felon
Felony.

ly violent hands on himself, and is the occasion of his untimely death, whether by hanging, drowning, stabbing, shooting, or any other way.

FELON, in law, a person guilty of felony. See FELONY.

Blackst.
Comment.

FELONY, in the general acceptation of the law, comprises every species of crime, which occasions at common law the forfeiture of lands or goods. This most frequently happens in those crimes for which a capital punishment either is or was to be inflicted: for those felonies that are called *clergyable*, or to which the benefit of clergy extends, were anciently punished with death in all lay, or unlearned offenders; though now, by the statute-law, that punishment is for the first offence universally remitted. Treason itself, says Sir Edward Coke, was anciently comprised under the name of *felony*: and in confirmation of this we may observe, that the statute of treasons, 25 Ed. III. c. 2. speaking of some dubious crimes, directs a reference to parliament; that it may be there adjudged, "whether they be treason or other felony." All treasons, therefore, strictly speaking, are felonies; though all felonies are not treason. And to this also we may add, that all offences, now capital, are in some degree or other felony: but this is likewise the case with some other offences, which are not punished with death; as suicide, where the party is already dead; homicide by chance-medley, or in self-defence; and petit-larceny, or pilfering; all which are (strictly speaking), felonies, as they subject the committers of them to forfeitures. So that, upon the whole, the only adequate definition of felony seems to be that which is before laid down: viz. an offence which occasions a total forfeiture of either lands or goods, or both, at the common law; and to which capital or other punishment may be superadded, according to the degree of guilt.

To explain this matter a little farther: The word *felony*, or *felonia*, is of undoubted feudal original, being frequently to be met with in the books of feuds, &c. but the derivation of it has much puzzled the juridical lexicographers, Prætorius, Calvinus, and the rest: some deriving it from the Greek, φάλαξ, "an impostor or deceiver;" others from the Latin, *falso fefelli*, to countenance which they would have it called *fellonia*. Sir Edward Coke, as his manner is, has given us a still stranger etymology; that it is *crimen animo felico perpetratum*, "with a bitter or gallish inclination." But all of them agree in the description, that it is such a crime as works a forfeiture of all the offender's lands or goods. And this gives great probability to Sir Henry Spelman's Teutonic or German derivation of it: in which language indeed, as the word is clearly of feudal original, we ought rather to look for its signification, than among the Greeks and Romans. *Fel-on* then, according to him, is derived from two northern words: *FEE*, which signifies (we well know) the fief, feud, or beneficiary estate; and *LON*, which signifies price or value. Felony is therefore the same as *pretium feudi*, the consideration for which a man gives up his fief; as we say in common speech, such an act is as much as your life, or estate is worth. In this sense it will clearly signify the feudal forfeiture, or act by which an estate is forfeited, or escheats, to the lord.

To confirm this, we may observe, that it is in this sense, of forfeiture to the lord, that the feudal writers

constantly use it. For all those acts, whether of a criminal nature or not, which at this day are generally forfeiture of copyhold estates, are styled *feloniae* in the feudal law: "*scilicet, per quas feudum amittitur.*" As "*si domino reservare noluerit;—si per annum et diem cessaverit in petenda investitura;—si dominum ejuravit, i. e. negavit se a domino feudum habere;—si a domino in jus eum vocante, ter citatus non comparuerit;*"—all these, with many others, are still causes of forfeiture in our copyhold estates, and were denominated *felonies* by the feudal constitutions. So likewise injuries of a more substantial or criminal nature were denominated *felonies*, that is, forfeitures: as assaulting or beating the lord; vitiating his wife or daughter, "*si dominum cucurbitaverit, i. e. cum uxore ejus concubuerit;*" all these are esteemed felonies, and the latter is expressly so denominated, "*si fecerit feloniam, dominum forte cucurbitando.*" And as these contempts, or smaller offences, were felonies or acts of forfeiture, of course greater crimes, as murder and robbery, fell under the same denomination. On the other hand, the lord might be guilty of felony, or forfeit his seignory to the vassal, by the same act as the vassal would have forfeited his feud to the lord. "*si dominus commisit feloniam, per quam vassallus amitteret feudum si eam commisserit in dominum feudi proprietatem etiam dominus perdere debet.*" One instance given of this sort of felony in the lord is beating the servant of his vassal, so as that he loses his service; which seems merely in the nature of a civil injury, so far as it respects the vassal. And all these felonies were to be determined, "*per laudamentum sive judicium parium suorum,*" in the lord's court; as with us forfeitures of copyhold lands are presentable by the homage in the court-baron.

Felony, and the act of forfeiture to the lord, being thus synonymous terms in the feudal law, we may easily trace the reason why, upon the introduction of that law into England, those crimes which induced such forfeiture or escheat of lands (and, by a small deflexion from the original sense, such as induced the forfeiture of goods also) were denominated *felonies*. Thus it was that suicide, robbery, and rape, were felonies; that is, the consequence of such crimes was forfeiture; till by long use we began to signify by the term of *felony* the actual crime committed, and not the penal consequence. And upon this system only can we account for the cause, why treason in ancient times was held to be a species of felony; viz. because it induced a forfeiture.

Hence it follows, that capital punishment does by no means enter into the true idea and definition of *felony*. Felony may be without inflicting capital punishment, as in the cases instanced of self-murder, excusable homicide, and petit-larceny; and it is possible that capital punishments may be inflicted, and yet the offence be no felony; as in case of heresy by the common law, which, though capital, never worked any forfeiture of lands or goods, an inseparable incident to felony. And of the same nature was the punishment of standing mute, without pleading to an indictment; which at the common law was capital, but without any forfeiture, therefore such standing mute was no felony. In short, the true criterion of felony is forfeiture: for, as Sir Edward Coke justly observes, in all felonies which are punishable with death, the offender loses all his

Felony.

Felt,
Felt spar.

his lands in fee-simple, and also his goods and chattels ; in such as are not punishable, his goods and chattels only.

The idea of felony is indeed so generally connected with that of capital punishment, that we find it hard to separate them ; and to this usage the interpretations of the law do now conform. And therefore, if a statute makes any new offence felony, the law implies that it shall be punished with death, viz. by hanging, as well as with a forfeiture : unless the offender prays the benefit of clergy ; which all felons are entitled once to have, unless the same is expressly taken away by statute.

Felonies by statute are very numerous ; and as this work will not admit of a proper enumeration, we must refer to the Table of the quarto edition of the Statutes, where they are set forth in alphabetical order.

FELT, in commerce, a sort of stuff deriving all its consistence merely from being fulled, or wrought with lees and size, without either spinning or weaving.

Felt is made either of wool alone, or of wool and hair. Those of French make, $3\frac{1}{2}$ yards long, and $1\frac{1}{2}$ broad, for cloaks, pay each 2 l. 14s. 1 $\frac{1}{2}$ d. on importation ; and draw-back 1 l. 12s. 3 d. on exporting them again.

FELT-Spar, or *Rhombic Quartz*, the *petuntse* of the Chinese, a genus of siliceous earths, according to Cronstedt, resembling the jasper in most respects. Its German name is *felt-spar*, from the word *feld*, which signifies a field, and likewise a compartment or regular surface. Hence, according to Mr Fortier, the word *feld-spar* signifies a spar composed of little compartments of rhombic or other figures. It strikes fire with steel, and melts in a violent heat. M. Bayen, who analysed it by acids, obtained a considerable quantity of argillaceous and siliceous earths, a smaller quantity of magnesia, and a still smaller of calcareous earth and iron. It is found either sparry or crystallized. The former species has several varieties. 1. White. 2. Reddish brown, occurring in the Swedish and other granites. 3. Pale yellow. 4. Greenish, resembling the schorl or cockle spar, but less fusible, and more irregular in the figure. The crystallized kind is found in an iron mine in Westmanland in Sweden, seldom in the form of veins, and still more rarely constituting the substance of whole mountains, but generally mixed either with quartz or mica ; in which case it is called *granite*. When mixed with jasper, along with some particles of quartz, cockle, and horn blende, it is named *porphyry*.

Another kind of this stone, named by Mr. Bayen *white felt spar*, is found in the duchy of Lorraine. It is of an opaque white colour, spotted on the outside with ochre. It consists of shining particles, which give it a sparry appearance : it is very hard, and strikes fire with steel, is affected by acids ; and when analysed by them, appears to contain one half its weight of siliceous earth, the other being composed of magnesia and iron.

Analogous to the felt-spar is that beautiful stone named *Labrador-stone*, lately brought to Europe. It was discovered some years ago by the Moravians, who have a colony among the Esquimaux, in the country

of Labrador in North America. It is found of a light or deep-grey colour, but for the most part of a blackish grey. When held in the light in various positions, it discovers a variety of colours, such as the blue of lapis lazuli, grass-green, apple-green, pea-green, and sometimes, but more seldom, a citron yellow. Sometimes it has a colour between that of a red copper and tom-buck-grey ; at other times the colours are between grey and violet. For the most part these colours are in spots, but sometimes in stripes on the same piece. The stones are found in pretty large angular pieces, appear foliated when broken, and the fragments of a rhomboidal figure. Their specific gravity is about 2.755, and in other respects they agree with the felt-spar. Werner informs us, that he has seen a piece of felt-spar at Gayer, which showed a great variety of colours, but very pale.

Mr Kirwan observes on the felt-spar, in general, that it is found of many different colours, as white, yellow, red, brown, green, violet, &c. sometimes crystallized in rhombs, cubes, or parallelepipeds ; at other times without any regular figure. It breaks like spar, but the texture is close though lamellar. The specific gravity, according to our author, is from 2.400 to 2.600, but Mr Gerchard says he found it as high as 3.500 ; in which case Mr Kirwan is of opinion that it was mixed with some metallic particles. It is harder than the fluor spars, but less so than quartz. It also melts without addition more perfectly and easily than the fluors, forming a whitish glass, which does not corrode the crucibles as that from fluor does. It is entirely dissolved without effervescence by the microcosmic salt and by borax ; but unites with difficulty to fixed alkalis. In its crystallized state it decrepitates in the fire, but not otherwise. It is found in loose masses, about two inches long at most, without forming either veins or strata. It is also found mixed with sand or clay ; or it is sometimes found imbedded in other stones, as granite, &c. One hundred parts of the white spar contain 67 of siliceous, 14 of argillaceous, 11 of ponderous earth, and 8 of magnesia. According to Mr Kirwan, it is undoubtedly the stone used by the Saxons, as *petuntsa*, in their porcelain manufactures.

Cronstedt, who supposes this stone to be of the same nature with jasper, remarks that "if the rhombic quartz and jasper were of the same species, that sort of porphyry which is made up of these two bodies ought only to be ranked with the *jaspers*, instead of being placed with the *saxa*. It is observable, however, in old monuments, which have been long exposed to the air, that though porphyry had decayed in such a manner as to lose its polish, yet granite, though equally old, and composed for the most part of rhombic quartz, has preserved its lustre. This, however, does not contradict the possibility of rhombic quartz being the same substance with the jasper : the calcareous spar, for instance, being found to bear the weather, and even fire, better than limestone."

FELTRIA, (anc. geog.), a town on the borders of Rætia towards Italy. Now *Feltri*, in the territory of Venice, on the Piava. E. Long. 12. 16. N. Lat. 46°.

FELUCCA, in sea-affairs, a little vessel armed with six

Felt-spar
||
Felucca.

Female
Fen.

six oars, frequent in the Mediterranean; which has this peculiarity, that its helm may be applied either in the head or stern, as occasion requires.

FEMALE, (*FEMINA*), a term peculiar to animals, signifying that sex which conceives and generates its young within itself. See **SEX** and **GENERATION**.

FEMALE is also applied, figuratively, to things without life, from the resemblance they bear to the females of animals. Thus we say a

FEMALE-Screw. See **SCREW**.

FEMALE-Flower. See *Femineus FLOS*.

FEMALE-Plant. See *Feminea PLANTA*.

FEMME COVERT, in law, a married woman. See **COVERTURE**.

FEMME Sole, an unmarried woman, whose debts, contracted before marriage, become those of her husband after it.

A *femme-sole* merchant, is where a woman, in London, uses a trade alone, without her husband; on which account she shall be charged without him.

FEMININE, in grammar, one of the genders of nouns. See **GENDER**.

The feminine gender is that which denotes the noun or name to belong to a female. In the Latin, the feminine gender is formed of the masculine by altering its termination; particularly by changing *us* into *a*. Thus, of the masculine *bonus equus*, "a good horse," is formed the feminine *bona equa*, "a good mare;" so of *parvus homo*, "a little man," is formed *parva femina*, "a little woman," &c.

In French, the feminine gender is expressed, not by a different termination, but by a different article: thus, *le* is joined to a male, and *la* to a female.

In English, we are generally more strict, and express the difference of sex, not by different terminations, nor by different particles, but different words; as boar and sow, boy and girl, brother and sister, &c. — though sometimes the feminine is formed by varying the termination of the male into *ess*; as in abbot, abbess, &c.

FEMUR, OS **FEMORIS**, in anatomy. See there, n° 58.

FEN, a place overflowed with water, or abounding with bogs. See **BOG** and **DRAINING**.

Fens are either made up of a congeries of bogs; or consist of a multitude of pools or lakes, with dry spots of land intermixed, like so many little islands.

Several statutes have been made in England for the draining of fens, chiefly in Kent, Cambridgeshire, Bedfordshire, and Lincolnshire; and by a late act, 11 Geo. II. commissioners shall be appointed for the effectually draining and preserving of the fens in the isle of Ely, who are authorised to make drains, dams, and proper works thereon; and they may charge the land-holders therein with a yearly acre-tax, and, in default of payment, sell the defender's lands.

The wet grounds called *fens* in Lincolnshire and elsewhere in England, bring many advantages to the inhabitants of those counties. Fowl and fish are very plentiful in them. The pike and eels are large and easily caught, but they are usually coarse. The duck, mallard and teal, are in such plenty as is scarce to be conceived. They are taken by **DECOYS** in prodigious flocks at a time. They send these fowl from Lincoln-

shire to London, twice a-week, on horseback, from Michaelmas to Lady-day; and one decoy will furnish 20 dozen, or more, twice a-week, for the whole season in this manner. The decoy-men contract with the people, who bring them to London at a certain rate, and they are obliged to take off their hands the whole number that is caught. Two teal are usually reckoned equal to one duck; and six ducks and 12 teal are accounted a dozen of wild-fowl; and the usual market price is about 9s. for such a dozen. About midsummer, during the moulting season, a great number also are destroyed by the people in the neighbourhoods. The poor birds at this season are neither able to swim nor fly well; and the people going in with boats among the reeds where they lie, knock them down with long poles. A little before Michaelmas, vast flights of these birds arrive at the decoys from other places; they soon grow fat in them, and continue there a prey to the masters or owners, as long as the decoys are unfrozen; but, when they are iced over, they fly away again, and go to the neighbouring seas for food.

The fens also abound in a sort of herbage that is very nourishing to cattle. Sheep and horses always grow fat upon it. These fens are common, and the owners of cattle mark them that they may be known. It is remarkable, that though all is open, the cattle used to one particular spot of ground seldom leave it, but the owner may always find them in or near the same place. The fens have many large and deep drains. In these the pike and eel grow to a vast size; and they are full of geese which feed on the grass; but these eat rank and muddy, and may even be smelt as soon as a person comes into the room where they are roasting. But the people have another very great advantage from these birds besides the eating of them, namely, their feathers and quills; and the produce of these is so great, that the custom-house-books in the town of Boston show, that there are frequently sent away in one year 300 bags of feathers, each containing a hundred and a half weight. Each pound of feathers brings in the owner twopence; and it may be thought strange by people unacquainted with these things, but it is a certain truth, that the owners pull them five or six times a year for the feathers, and three times for the quills. Each pulling comes to about a pound, and many people have 1000 geese at a time or more. They are kept at no charge except in deep snowy weather, when they are obliged to feed them with corn.

Oats also grow very well in many of the fen countries, and in good seasons bring great increase and advantage to the owners. There is also another vegetable of great profit to them. This is the *rapum silvestre*; the seed of which they call *cole-feed*; and they make an oil from it of great use in trade. They grind the seed between two large stones, the one standing perpendicularly on the other. The stones are made of a sort of black marble, and are brought from Germany. They sometimes turn them by sails, and sometimes by the drains which carry off the water from the fen lands.

The fens lying low, and being of a vast extent, are very subject to be overflowed by waters from the neighbouring high countries: and though great care and expence

Fen.

Fence.

expenſe is uſed to keep them dry, they are often like a ſea; and the ſheep are obliged to be carried off in boats and the people to live in their upper rooms, and to be ſupplied with provisions alſo with boats.

FENCE, in gardening and huſbandry, a hedge, wall, ditch, bank, or other incloſure, made round gardens, fields, woods, &c.

In hot climates, where they have not occaſion for walls to ripen their fruit, their gardens lie open, where they can have a water-fence, and proſpects; or elſe they bound their gardens with groves, in which are fountains, walks, &c. which are much more pleaſing to the ſight than a dead wall: but, in colder climates, we are obliged to have walls to ſhelter and ripen our fruit, although they take away much from the pleaſant proſpect of the garden. Brick walls are accounted the beſt and warmeſt for fruit: and theſe walls, being built pannelwiſe, with pillars at equal diſtances, will ſave a great deal of charge, in that the walls may be built thinner than if they were made plain without theſe pannels, for then it would be neceſſary to build them thicker every where; and, beſides, theſe pannels make the walls look the handſomer. Stone-walls, however, on account of their durability, are to be preferred to thoſe of brick, eſpecially thoſe of ſquare hewn ſtones. Thoſe that are made of rough ſtones, though they are very dry and warm, yet by reaſon of their unevenneſs, are inconvenient to nail up trees to, except pieces of timber be laid in them here and there for that purpoſe.

But in large gardens, it is better to have the proſpect open to the pleaſure-garden; which ſhould be ſurrounded with a ſoſſe, that from the garden the adjacent country may be viewed. But this muſt depend on the ſituation of the place: for if the proſpect from the garden is not good, it had better be ſhut out from the ſight than be open. As alſo, when a garden lies near a populous town, and the adjoining grounds are open to the inhabitants: if the garden is open, there will be no walking there in good weather, without being expoſed to the view of all paſſengers, which is very diſagreeable.

Miller's
Gardener's
Dictionary.

Where the ſoſſes are made round a garden which is ſituated in a park, they are extremely proper; becauſe hereby the proſpect of the park will be obtained in the garden, which renders thoſe gardens much more agreeable than thoſe that are confined.—In the making theſe ſoſſes there have been many inventions; but upon the whole, none ſeem preferable to thoſe which have an upright wall next the garden, which (where the ſoil will admit of a deep trench) ſhould be five or ſix feet high; and, from the foot of this wall, the ground on the outside ſhould riſe with a gradual, eaſy ſlope, to the diſtance of 18 or 20 feet; and where it can be allowed, if it ſlopes much farther it will be eaſier, and leſs perceptible as a ditch, to the eye, when viewed at a diſtance; but, if the ground is naturally wet, ſo as not to admit of a deep ſoſſe, then, in order to make a fence againſt cattle, if the wall be four feet high, and ſlight poſts of three feet high are placed juſt behind the wall, with a ſmall chain carried on from

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poſt to poſt, no cattle or deer will ever attempt to jump againſt it; therefore, it will be a ſecure fence againſt them; and if theſe are painted green, they will not be diſcerned at a diſtance, and at the ſame time the chain will ſecure perſons walking in the garden from tumbling over.

In places where there are no good proſpects to be obtained from a garden, it is common to make the incloſure of park-paling; which, if well performed, will laſt many years, and has a much better appearance than a wall: and this pale may be hid from the ſight within, by plantations of ſhrubs and evergreens; or there may be a quick-hedge planted within the pale, which may be trained up, ſo as to be an excellent fence by the time the pales begin to decay.

Fences round parks are generally of paling; which if well made of winter-fallen oak, will laſt many years. But a principal thing to be obſerved, in making theſe pales, is not to make them too heavy; for, when they are ſo, their own weight will cauſe them to decay: therefore, the pales ſhould be cleft thin; and the rails ſhould be cut triangular, to prevent the wet lodging upon them; and the poſts ſhould be good, and not placed too far aſunder. If theſe things are obſerved, one of theſe pales will laſt, with a little care, upwards of forty years very well. The common way of making theſe fences is, to have every other pale nine or ten inches above the intermediate ones; ſo that the fence may be ſix feet and a half high, which is enough for fallow deer; but, where there are red deer, the fence ſhould be one foot higher, otherwiſe they will leap over.

Some incloſe their parks with brick walls; and in countries where ſtone is cheap, the walls are built with this material; ſome with, and others without mortar.

A kitchen-garden, if rightly contrived, will contain walling enough to afford a ſupply of ſuch fruits as require the aſſiſtance of walls, for any family; and this garden, being ſituated on one ſide, and quite out of ſight of the houſe, may be ſurrounded with walls which will ſcreen the kitchen garden from the ſight of perſons in the pleaſure-garden; and, being locked up, the fruit will be much better preſerved than it can be in the public garden; and the having too great a quantity of walling is often the occaſion that ſo many ill-managed trees are frequently to be ſeen in large gardens.

The height of garden walls ſhould be 12 feet, which is a moderate proportion; and if the ſoil be good, it may in time be well furniſhed with bearing-wood in every part, eſpecially that part planted with pears, notwithſtanding of the branches being trained horizontally from the bottom of the walls.

With regard to the more common kinds of fences, Mr Anderson gives the following directions, in his *Eſſays on Agriculture, &c.* “The fences that are moſt univerſally employed, are either ſtone-dikes or hedges (A). Dikes, if well built, as effectually preſerve a field from the intrusion of domeſtic animals, as any other kind of fence whatever; but they afford little

C c

warmth

(A) *Dike* is a term employed to denote any kind of wall reared for the purpoſe of incloſing a field and nothing elſe.

Fence.

warmth or shelter to the field : whereas hedges, if good, answer both these purposes equally well. But the most material distinction between dikes and hedges is, that dikes are in their highest degree of perfection as soon as they are reared, and from that moment begin to tend towards decay ; so that the person who builds this kind of fence immediately receives the full benefit thereof ; whereas hedges, being at first weak and tender, stand in need of attention and care, and do not become a fence for several years after they are planted ; and, as they continue to increase in strength and gradually acquire a higher and higher degree of perfection, it is long before they begin to fall towards decay ; so that they are, in general, infinitely more durable than dikes, although they are longer of becoming of use to the person who plants them. Which of these two kinds of fences may, upon the whole, be most eligible, must, in general, be determined by the circumstances and views of the possessor of the ground to be inclosed. If he is a tenant who has a short lease, without a prospect of getting it renewed ; or, if he has immediate occasion for a complete fence ; it will be, in general, most prudent in him to make choice of dikes, if the materials for rearing these are at hand : but, if there is any probability that his posterity may reap any advantage from these inclosures, it will be almost always more for his advantage to make choice of hedges.

“ A dike built of freestone and lime will be almost as durable as a hedge ; although, in general, it will neither be so cheap nor agreeable. But dry-stone dikes, unless built of the finest quarried stone, are of such a perishable nature, as to be hardly ever worth the expence of rearing ; and never, excepting where the field that you would wish to inclose has plenty of stones upon its surface, which you are under a necessity of carrying away before the field can be improved. In this situation a man may, in some measure be excused, if he should be tempted to put them into dikes ; because the carriage of these stones may be said to cost him nothing : and he may, perhaps, be at some loss how to dispose of them in any other manner. But, in all other circumstances, it is very bad economy to rear fences of this kind, as seal dikes can always be built at one-fourth of the expence that these would cost—will answer all purposes equally well ; and, if carefully built, will be kept in repair for any number of years at as small an expence as they could be.

“ The want of durability generally complained of in these dikes is owing to their bad construction. The greatest part of them are made of a considerable thickness, with a ditch on each side ; the heart of the dike being made up with the earth that is taken from these ditches ; and only a thin wall, on each side, is built of solid seal from top to bottom ; the consequence of which is, that as the loose earth that is thrown into the middle of the dike subsides much more than the seal on each side, the top of the dike sinks down ; and, of course, the two side-walls are pressed too much upon the inside, so as to bilge (swell) out about the middle, and quickly crumble down to dust. To avoid this inconvenience, I have always chosen to build my dikes of this sort thinner than usual : they being only three feet and an half thick at the bottom : one foot, or a very little more, at top ; and five feet high ; taking care to have them built in such a manner, as that every

sod (seal) from top to bottom binds the joinings of the others below it, with as much accuracy as the bricks in a well-built wall. The uppermost course of seal is cut a little longer than those that are immediately below it, and placed with the grassy side uppermost, so as to project a little on each side ; which not only helps to throw the water a little off the dike, but also to prevent sheep or cattle from attempting to jump over it so readily as they otherwise might do. At the foot of the dike, on each side, is dug a small ditch, about a foot and a half or two feet deep ; leaving a ledge of a few inches broad on each side, that the dike may not be undermined by the crumbling down of the loose earth into the ditch. These ditches not only help to give the dike an additional height, and keep its foundation dry ; but are also of use to prevent cattle from coming close to it and rubbing upon it, or tearing it down with their horns which they are very apt to do if this precaution be omitted. The earth that is taken out of the ditches may be thrown outwards into the place that was occupied by the seal that has been taken to build the dike ; and if the field is in grass, a few seeds may be sowed upon it, and it will soon be covered as well as the rest of the field.

“ By having the joints bound in every direction, the fabric is rendered much firmer than it could be by any irregular manner of working, while it is at the same time more easily reared. If the ground is soft, and the seal rise well, I get a fence of this kind done for one penny halfpenny *per* yard ; but, if it is not good to work, a little more than that must be allowed. As to the time that a fence of this kind may stand without needing any repair, I cannot speak with certainty, as it is not long since I fell into this method of building them. The oldest has just now stood ten years, and seems to be nearly as firm as when first built. I have seen some walls of poor cottages which have been built somewhat after this manner, that have been good after standing 40 or 50 years : but their durability depends greatly upon the nature of the seal of which they are formed. The best is that which is taken from poor ground of a spongy quality, which is generally covered with a strong sward of coarse bent grass. And, in situations where this can be had, I would have no hesitation in recommending this as the cheapest and best temporary fence that could be reared.

“ The greatest inconvenience that attends this species of fence, is the danger it runs of being torn down by the horns, or wasted away by the rubbing, of cattle upon it ; which they will sometimes do notwithstanding of the ditches. This may be effectually prevented by planting a row of sweet-briar (*eglantine*) plants between the first and second course of seal when the dike is built, which will not fail to grow with luxuriance and in a short time defend the dike from every attack of this kind. But if sheep are to be kept in the inclosures, this plant ought not, on any account, to be employed ; for, as that animal naturally flies to the fences for shelter in stormy weather, the prickles of the straggling branches of the briar will catch hold of the wool, and tear it off in great quantities, to the great detriment of the flock and loss of the proprietor. In these cases, if the possessor of the ground is not afraid of the bad consequences that may be dreaded from the spread,

Fence.

Fence.

spreading of whins (*furze*), it would be much better to scatter a few of the seeds of this plant along the ledger at the foot of the dike, which would quickly become a preservative for it, and be otherwise of use as a green food for his sheep during the winter season. But, before he ventures to sow this plant, let him remember, that where it is once established, it will hardly fail to spread through the adjoining fields, and can hardly be ever afterwards thoroughly rooted out.

"I have often imagined that this kind of fence might be greatly improved both in beauty and strength, by planting a row of ivy plants beneath the first course of seal in building the dike; which would, in a short time, climb up the sides of the dike and cover the whole with a close and beautiful network of woody fibres; covered with leaves of the most beautiful verdure; which would tend to preserve the dike from being eat away by frost, and other vicissitudes of weather. And when it is arrived at the top, it would there send out a number of strong woody branches, forming a sort of hedge, that would afford some shelter to the fields, and break the force of the wind considerably; but as I never have yet had an opportunity of trying the experiment, I only here offer it as a probable conjecture. I have seen a garden-wall that had been built of stone and clay, ornamented and strengthened in this way. I have had the experience of ivy growing well upon a dry stone-dike: and have likewise seen it growing up the walls, and covering whole cottages built of seal; which have by this means been preserved entire, long after the walls that had been naked have fallen to decay. But, not having had plants of this kind at hand, I have not had an opportunity of trying it in the manner proposed; although, I think, there is the greatest reason to hope for success.

"Whins (*furze*) have been often employed as a fence when sowed upon the top of a bank. They are attended with the convenience of coming very quickly to their perfection, and of growing upon a soil on which few other plants could be made to thrive: but, in the way that they are commonly employed, they are neither a strong nor a lasting fence. The first of these defects may, in some measure, be removed, by making the bank upon which they are sowed (for they never should be transplanted) of a considerable breadth; in order that the largeness of the aggregate body, considered as one mass, may in some measure make up for the want of strength in each individual plant. With this view, a bank may be raised of five or six feet in breadth at the top, with a large ditch on each side of it; raising the bank as high as the earth taken from the ditches will permit; the surface of which should be sowed pretty thick with whin-seeds. These will come up very quickly; and in two or three years will form a barrier that few animals will attempt to break thro', and will continue in that state of perfection for some years. But the greatest objection to this plant as a fence is, that, as it advances in size, the old prickles always die away; there being never more of these alive at any time upon the plant, than those that have been the produce of the year immediately preceding: and these thus gradually falling away, leave the stems naked below as they advance in height; so that it very soon becomes an exceeding poor and unsightly fence; the stems being entirely bare, and so slender withal as

not to be able to make a sufficient resistance to almost any animal whatever. To remedy this great defect, either of the two following methods may be adopted. The first is, to take care to keep the bank always stored with young plants; never allowing them to grow to such a height as to become bare below: and it was principally to admit of this, without losing at any time the use of the fence, that I have advised the bank to be made of such an unusual breadth. For if one side of the hedge be cut quite close to the bank, when it is only two or three years old, the other half will remain as a fence till that side become strong again; and then the opposite side may be cut down in its turn; and so on alternately as long as you may incline: by which means the bank will always have a strong hedge upon it without ever becoming naked at the root. And as this plant, when bruised, is one of the most valuable kinds of winter-food yet known for all kinds of domestic animals*, the young tops may be carried home and employed for that purpose by the farmer; which will abundantly compensate for the trouble of cutting, and the waste of ground that is occasioned by the breadth of the bank.

"The other method of preserving a hedge of whins from turning open below, can only be practised where sheep are kept; but may be there employed with great propriety. In this case it will be proper to sow the seeds upon a conical bank of earth, shoved up from the surface of the ground on each side without any ditches. If this is preserved from the sheep for two or three years at first, they may then be allowed free access to it; and, as they can get up close to the foot of the bank upon each side, if they have been accustomed to this kind of food, they will eat up all the young shoots that are within their reach, which will occasion them to send out a great many lateral shoots; and these being continually browsed upon, soon become as close as could be desired, and are then in no sort of danger of becoming naked at the root, although the middle part should advance to a considerable height.

"The fences hitherto mentioned are only intended to preserve fields from the intrusion of cattle; but, on some occasions, it is necessary to have a fence that would even resist the efforts of men to break through it: as around bleaching-fields, orchards, &c.; the want of which often subjects the proprietor of such fields to very disagreeable accidents. And, as such a fence might, on some occasions, be procured at no great expence or trouble, it were to be wished that the method of doing this were more generally known than it is at present. To effectuate this, it is necessary to begin by trenching up or ploughing a large belt all around the field you mean to inclose, of 40 or 50 feet or more in breadth, if you find it convenient: the outer edge of which should be inclosed by a good dike, or a ditch and hedge. This belt should be kept in culture one year, and well manured, if your situation will admit of it; and laid up before winter in such a manner that no water may be allowed to lodge upon it; and planted in the winter-time all over with plants of egplantine so thick as not to be above two feet from one another; and between these put a good number of young birch plants not above two years old, interspersed with hazels, oak, ash, rawn (wild service), and other trees that you think will thrive upon your soil; together with

Fence.

* See Agriculture, n^o 47.

Fence. thorns, hollies, brambles, and wood-bine (honey-suckle); and having then fenced it from cattle, and kept down the weeds that may rise upon its surface by the hoe, as long as you can conveniently get access into it, leave it afterwards to nature. If this is done, and your soil be not extremely bad, the belt in a very few years will be entirely filled with a close bush of trees, so intermixed with the bending branches of the eglantine, and bound together by the trailing shoots of the bramble and wood-bine, that no animal above the size of a cat could penetrate; especially when it is of such a depth as I have recommended.

"The first hint that I got for a fence of this kind was from a small thicket of brushwood that I had planted for ornament, pretty much in the manner above described; which in a short time became so much interwoven with the sweet-briar, that it was impossible to find any access into it. But as all kinds of trees and shrubs, if planted very close upon one another, become naked at the root when they arrive at any considerable size, care should be taken to prevent it from ever coming to that state, by cutting it down whenever it becomes in danger of being open at the root. And as it would be improper ever to leave the field entirely defenceless, it is a great advantage to have the belt as broad as it conveniently may be, so that the one half of it may be a sufficient fence; by which means, we will have it in our power to cut down the inside and the outside of the belt alternately, so as still to keep the thicket young, and never to want at any time a sufficient fence; and the brush-wood that this afforded at each cutting would, in almost every situation, yield such a revenue as would do much more than indemnify the proprietor for the rent of the ground that was occupied by this fence. And if the field was in such a situation as required shelter, some trees might be allowed to grow to their full size about the middle, without any inconvenience, if the belt were of a sufficient breadth.

"There is one other species of fencing as useful as any of those already mentioned, which is in general much less understood, and more difficult to execute properly, that deserves here to be taken notice of; viz. the method of securing the banks of rivers from being washed away by the violence of the stream, and of preventing the damages that may otherwise be occasioned by the swelling of the waters.

"It frequently happens that, when a river runs in a bed of rich vegetable mould, the least accident that may chance to divert the stream towards any particular part of the bank, causes it to sweep away large tracts of fine ground, to the very great detriment of the proprietor, as well as the public; as this fine mould is usually carried to the sea, and the place that the water leaves to occupy the new bed that it thus forms for itself is generally of a much worse quality; consisting chiefly of stones, sand, and gravel. In some cases, where the whole force of the current is quite close to the bank, and the materials necessary for fencing it are not to be found, it may perhaps be impossible or very difficult totally to prevent this evil; but, for the most part, it admits of a cure that can be obtained at a pretty moderate expence.

"These ravages are always greatest where the bank rises perpendicularly to a pretty considerable height above the ordinary surface of the water, and never at those places where the banks shelve down gradually towards the water's edge: for, when the river is swelled to a great height by rains, and runs with a force and rapidity greater than usual, it strikes violently against these perpendicular banks that directly oppose its course, which being composed of earth quite bare and uncovered, are easily softened by the water, and quickly washed away; so that the upper part of the bank being thus undermined, falls by its own weight into the river, and is carried off in prodigious quantities: whereas at those parts of the bank that shelve gradually downwards to the water's edge, when the river rises to any considerable height, it gently glides along its surface; which being defended by the matted roots of the grass with which it is covered, scarcely sustains any damage at all; and is nearly the same after the water has retired within its banks as before the inundation. These facts, which no one who has bestowed the least attention to this subject can fail to have observed, clearly point out, that the first and most necessary step towards a cure, is to level down the edge of the bank that is next to the water, so as to make it slope gradually down towards the river. If the bank is very high, and you have no other particular use for the earth that must be taken from it, the easiest method of disposing of it, will be to throw it into the river: but, in whatever manner you may dispose of the earth, the slope of the bank must be continued until the inner edge of it is as low as the surface of the water at the driest time of the year, and be made to ascend gradually upwards from the water with an easy slope, till it comes to the level of the ground, or at least rises to such a height as that the water never exceeds. This operation ought to be performed as early in summer as possible, and should be either immediately covered with turf, pared from the surface of some field that has a very strong sward upon it, taking care to lay these in such a manner as to be in as little danger as possible of being washed away by any accidental flood that might happen before they had grown together; or, if the turf of this kind cannot be easily had, it should be sowed very thick with the seeds of some small matt-rooted grass, that should be kept in readiness for this purpose (c).

"If the stream has not been extremely rapid at the foot of the bank, some of the earth that was thrown into the water will be allowed to subside to the bottom, and will there form a bank of loose soft earth, which will be of great use afterwards in preventing the face of the bank under water from being washed away; but, in order to secure this bulwark effectually for the future, the surface of this soft earth ought to be instantly stuck full of the roots of bog-reeds, flags, water-spiderwort, rushes, and other matt-rooted aquatic plants; which, if allowed to remain till they have once struck root, will afterwards form a barrier that nothing will ever be able to destroy. But, if the stream be too rapid to admit of this, and the bank of soft earth is much deeper than the surface of the water, it will be of use to fill up the breast of the bank with loose stones carelessly

(c) The creeping meadow-grass, *poa repens*, is a proper grass for this purpose.

Fence,
Fencing.

carelessly thrown in, till they rise near the surface of the water which would most effectually secure it against any future encroachments, if the bank is sloped away above.

"If it should so happen that stones cannot be easily got for this purpose, the only resource which in this case remains, is to dig the bank so low, that at the undermost edge, it may be always below the surface of the water, and carry it out in this way for a considerable distance, and then stick the whole surface that is below the water full of matt-rooted aquatic plants; which will in a great measure, if not entirely, defend it from any future encroachments. This bank ought to continue to shelve downwards even where it was below water, and those aquatics that will grow in the greatest depth of water be planted on the innermost brink, and the others behind them. The water spider-wort will grow in four feet depth of water, and the roots of the common yellow-flowered water-iris forms such a strong and compact covering upon the surface of the soil on which it grows, as would defend it from being affected by the water almost as well as if it were a rock: it is likewise an advantage attending this plant, that it grows upon a firm bottom, and chiefly delights in running water.

"If the stratum of soft earth is not so deep as to reach to the surface of the water, and lies upon a stratum of rock or hard gravel, there will be no occasion for throwing in stones of any kind. But, as it is difficult to unite the vegetable mould to any of these strata, there will always be some danger of its separating from these in violent inundations; and if the water once gets an entry, it will not fail to grow larger and larger by every future inundation. To prevent this inconvenience, it will be necessary, after you have sloped the earth away till you reach the gravel or rock, to cover the place where the edge of the earth joins the inferior stratum with a good many small stones, if they can be found; sowing between them the seeds of any kind of plants that you think are most likely to thrive, which have strong matted roots with as small and flexible tops as possible. You will easily observe, that from the impossibility of ever making earth adhere firmly to stone of any kind, it must always be an improper practice to face the banks of a river to a certain height with stone which is coped at top with earth."

For the most proper methods of raising hedges of different kinds, see HEDGE.

FENCE-Month, the month wherein deer begin to fawn, during which it is unlawful to hunt in the forest.

It commences 15 days before mid-summer, and ends 15 days after it. This month, by ancient foresters, is called *defence-month*.

FENCING, the art of making a proper use of the sword, as well for attacking an enemy as for defending one's self.

This art is acquired by practising with foils, called in Latin *rudes*; whence fencing is also denominated *gladiatura rudiaria*.—It is one of the exercises learnt in the academies (see EXERCISE and ACADEMY); and is an accomplishment both agreeable and useful:—Agreeable, as it affords gentlemen a noble and distinguished amusement:—Useful, as it forms their body;

and furnishes them with the faculty of defence, whether it be of their honour or their life, when the one or the other is attacked by those turbulent and dangerous persons whose correction is of service to society in general.

Pyrrad assures us, that the art of fencing is so highly esteemed in the East-Indies, that none but princes and noblemen are allowed to teach it. They wear a badge or cognizance on their right arms, called in their language *esaru*; which is put on with great ceremony, like the badges of our orders of knighthood, by the kings themselves.

Fencing is divided into two parts, *simple* and *compound*.

Simple is that performed directly and nimbly, on the same line; and is either offensive or defensive.—The principal object of the first is, whatever may be attempted, in pushing or making passes, from this or that point, to the most uncovered part of the enemy. The second consists in parrying and repelling the thrusts aimed by the enemy.

The *compound* includes all the possible arts and inventions to deceive the enemy, and make him leave that part we have a design on bare and unguarded, upon finding we cannot come at it by force, nor by the agility of the simple play. The principal means here of are, on the offensive side, feints, appeals, clashings, and entanglings of swords, half-thrusts, &c.; and, on the defensive, to push in parrying. Of all which a detail would be here useless, as they are only to be understood and acquired from personal instructions conjoined with practice.

FENELON (Francis de Salignac de la Motte), was of an ancient and illustrious family, and born at the castle of Fenelon in Perigord in 1651. In 1689, he was appointed tutor to the dukes of Burgundy and Anjou; and in 1695 was consecrated archbishop of Cambray. After this preferment, a storm rose against him, that obliged him to leave the court for ever, occasioned by his performance entitled, *An Explication of the Maxims of the Saints concerning the Interior Life*; in which he was supposed to favour the extravagant notions of Madam Guyon, and the principles of Quietism. A controversy on this occasion was for some time carried on between him and M. Bossuet, bishop of Meaux: which terminated in an appeal to the pope; when his holiness condemned the archbishop's book, by a brief dated March 12th, 1699. Some friends indeed pretend that there was more of court-policy than religious zeal in this affair: but be this as it may, the archbishop submitted patiently to this determination; and, retiring to his diocese of Cambray, acquitted himself punctually in all the duties of his station, and led a most exemplary life. The work that gained him the greatest reputation, and which will render his memory immortal, is his *Adventures of Telemachus*; the style of which is natural, the fictions well contrived, the moral sublime, and the political maxims tending all to the happiness of mankind. Hence it is thought, as the printing of this work was stopped at Paris, that the prelate's heresy was in politics instead of religion; and though his disgrace was prior to this work, he had, while he was tutor to the young princes, taught them the same principles asserted and exemplified in *Telemachus*. Fenelon died in 1715; and a collection of

Fencing,
Fenelon.

Fennel of all his religious works was afterwards printed at Rotterdam, under the care of the marquis de Fénélon his grand-nephew, when ambassador to the States-General.

FENNFL, in botany. See **ANETHUM**.

FENTON (Sir Geoffrey), privy-counsellor and secretary in Ireland during the reigns of queen Elizabeth and king James I. is well known for his translation of *Guicciardin's History of the Wars of Italy*, dedicated to queen Elizabeth in 1579. He died at Dublin in 1608; after having married his daughter to Mr Boyle, afterward the great Earl of Corke.

FENTON (Elijah), descended from an ancient family was born at Shelton near Newcastle, but in what year is uncertain. He was the youngest of 12 children, and was intended for the ministry; but embracing principles contrary to the government, while at Cambridge, he became disqualified for entering into holy orders. After he quitted the university, he was secretary to the earl of Orrery; but seems to have spent the most of his life amongst his friends and relations, and used to pay an annual visit to his elder brother, who enjoyed an estate of L. 1000 a-year. He was a man of great tenderness and humanity, enjoyed the fairest reputation, and was much esteemed by Mr Pope; who when he died in 1730, paid him the tribute of a very elegant epitaph. He published a volume of poems in the year 1717; and in 1723 was acted his tragedy of *Mariamne*, built upon her story collected from Josephus in the third volume of the *Spectator*.

FENUGREEK. See **TRIGONELLA**.

FEOD, or **FEUD**, is defined to be a right which a vassal hath in lands or some immoveable thing of his lord's, to use the same, and take the profits thereof hereditarily, rendering unto the lord such feudal duties and services as belong to military tenure, &c. and the property of the soil always remaining to the lord.

FEODAL, of or belonging to a **FEUD** or **FEE**.

FEODAL System, the constitution of **FIEFS** or **FEUDS**.

About 12 centuries ago, this system was so universally received in Europe, that Sir Henry Spelman calls it *the law of nations in our western world*. Hence it deserves our attention in a particular manner; a knowledge of the different feuds being indispensably requisite for a proper understanding either of the civil government of our own country, or the laws by which its landed property is regulated.

The military policy of the Celtic or northern nations, known by the names of *Goths, Vandals, Franks, Huns, and Lombards*, furnished the original constitution or system of feuds. These people pouring out in vast multitudes from the same *officina gentium* or "storehouse of nations," over-ran all the European countries on the declension of the Roman empire. They brought

the feudal system along with them from the countries out of which they emigrated; and, supposing it to be the most proper method of securing their new conquests, they introduced it into their more southerly colonies.

According to this system, the victorious general allotted considerable tracks of land to his principal officers; while they, in like manner, divided their possessions among the inferior officers, and even those common soldiers who were thought to be the most deserving. Allotments of this kind were named *feoda, fiefs, fees, or feuds*, from a combination of words, in the language of these barbarians, signifying a reward or stipend bestowed on certain conditions (A). The condition upon which these rewards were given was, that the possessors should faithfully serve the person from whom they were received, both at home and abroad, in the military way. To this they engaged themselves by a *juramentum fidelitatis*, or oath of fealty*; in the event of a breach of which, either by not performing the service agreed upon, by deserting their lord in time of battle, &c. the lands were to return to their original possessor.

Thus the possessors of feudal allotments became interested in the defence of them; and not only the receivers, but those who gave them, were equally mutually bound to defend their possessions, none of them being able to pretend any right but that of conquest. For this purpose, government and subordination were absolutely necessary; it being impossible to conduct any system of defence where every thing was tumultuous and irregular. Every person, therefore, who was a feudatory, *i. e.* who had received lands, was bound to do every thing in his power to defend the lord of his fee; while, on the other hand, the latter was no less subordinate to his immediate superior; and so on to the prince himself. In like manner a reciprocal bond of defence existed down from the prince to the lowest feudists.

Such were the foundations on which the feudal system was properly established; and the natural consequence was, a military subjection throughout the whole community. The prince could always collect an army of feudatories ready to defend not only the kingdom in general, but the particular possessions of each person; and the propriety of this constitution was soon apparent in the strength which these newly erected kingdoms acquired, and the valour with which their conquests were defended.

Besides these feudal grants, however, which were held only on the terms of military service abovementioned, there were others called *allodial*, which were given upon more enlarged principles. To these every free man had a title; and could not only claim his territory as well as the rest, but dispose of it at his pleasure

Feodal.

* See the Article Feodal Tenure.

² General nature of the feudal association.

³ Of allodiality.

¹ Origin of feuds.

(A) We are informed by Pontopiddan, that *ODH* in these northern languages is the same with *proprietas*, and *ALL* with *totum* in the Latin. Hence, among the northern nations, he tells us, that *ODHALT* signifies *right*; and hence we may conjecture, that the *UDAL* right in Finland is derived*. By transposing these two northern syllables, we form the word *ALLODH*; whence we have the etymology of the *allodium* or *absolute* property claimed by the holders of fiefs or feuds; and by combining *ODH*, signifying "property," with the word *fee*, signifying, "a conditional stipend or reward," we have the word *FEODH*, signifying, "a property given by way of stipend or reward upon a certain condition."

* See Macdowell's *Indit.* part 2.

Feodal.

pleasure (B); and this freedom was denominated *allodality*. These allodials, however, were not exempted from military service. A part of their freedom consisted in liberty to go to the wars; for this, in the barbarous times we speak of, was the only way to acquire any degree of renown. Only the slaves were destined to follow the arts of peace; while every free person was not only at liberty to defend his country, but under an obligation to do it in case of any urgent necessity.

4
Feodal and
national
militia.

Thus there was a feudal and a national militia. The free people only were allowed to possess property; the *feudal vassals* constituted the army, properly so called; while the national militia was composed of the allodial proprietors. This allodality, however, was not confined to landed property, but included likewise moveable estates or money; so that proprietors of the latter kind were obliged also in times of danger to bear arms and appear in the field. Between the feudal and allodial proprietors, however, there was this farther difference, that the latter had no concern with any private quarrels which might take place among the lords themselves; so that they were never obliged to appear in the field unless when called forth by the sovereign against the enemies of the nation at large. This circumstance we might suppose to be an advantage, but it ultimately operated otherwise; becoming the means of changing the allodial right into a feudal tenure. For some time the holders of fiefs had an eminent advantage over the allodial proprietors. This was owing to the imperfection of government in those days; so that the nobles had it in their power to revenge their own quarrels, while the weak were equally exposed to the insults of both parties. The lord and his vassals therefore were always formidable; but the allodial proprietors had scarce any means of defending themselves. The reason of this was, in the first place, that the law did not allow them to commit any hostilities; and in the next, they were too distant and unconnected to form any proper league for mutual de-

5
Different
situations
of the feo-
dal and of
the allodial
proprietor.

fence; and hence proceeded the necessity already hinted at, of converting allodial property into feudal tenure. This was indeed owing in a great measure to the absurdity and violence of the times, by which gifts of property, burthened with service, and which might return to the person who granted them, were rendered superior in value to the absolute and unconditional possession of a subject. Other considerations, however, besides that just mentioned, contributed to produce the same effect. As in those dark ages no right existed but what had its origin in conquest, it thence followed that the greatest conqueror or warrior was the most honourable person. The king, in whom the whole exploits of the community centred, as being their head, was the most honourable person; all others derived from him that portion of honour which they enjoyed, and which was most nicely adjusted in proportion as they approached him. Allodial proprietors therefore having no pretensions of this kind, were treated with contempt as a kind of poltroons. From this disagreeable situation they wished to free themselves, by converting their allodial property into feudal tenures; while the princes, supposing it their interest to extend those tenures as much as possible, discouraged the allodial possessions. As the feudists supported the importance of the nation and dignity of the monarch, it was not thought proper to allow the allodial proprietors any greater compensations than what were given to vassals in similar cases. Thus they were exposed to continual mortifications in the courts of justice; they were neglected by the king; denied sufficient protection from the laws; exposed not only to continual insults, but to have their property on all occasions destroyed by the great: so that they were without resource except from the feudal tenures, and were obliged even to solicit the privileges which were bestowed in other cases on vassals. In these unhappy circumstances, they were glad to yield up their lands to any superior whom they thought most agreeable, and to receive them back from him as a feudal gift.

Feodal.

6
Conversion
of allodium
into tenure.

Thus

(B) The author of *A view of Society in Europe*, has traced the remote sources of the feudal laws in an elegant and spirited manner (Book I. Chap. II. Sect. I.) Tacitus informs us, that the individuals of each of the German nations cultivated by turns a tract of land proportionable to their number, for the use of the whole; after which each individual received such an allotment of the cultivated tract as his dignity seemed to require. These nations had not altered their political principles at the time they over-ran the Roman empire; and hence the provinces of it were then divided after the same manner. The most considerable allotment was bestowed on the king, as being the most dignified person in the community, and this allotment was styled his *domain*; while the shares of citizens and warriors, which were likewise in proportion to the merit or dignity of each, constituted what was called *allodality*. But as it often happened that all the land was not exhausted by these partitions, what remained was considered as the property of the community, and in the barbaric codes was called the *lands of the fisc*. In such German nations as had thus obtained a settlement, it was necessary that there should be a more close connection betwixt the sovereign and the chiefs, as well as between the chiefs and people, than in others. This was effected by means of the lands of the *fisc*; for of these the sovereign took possession, dealing them out to the chiefs under the burthen of appearing in arms whenever he should please to call: while the chiefs in like manner dealt out lands to those called their *retainers*, who were also obliged to supply them with military assistance in cases of necessity. Hence a political system was founded, which had a prodigious effect on society in all those countries where it prevailed. The intention and tendency of this system was to render the nation independent both at home and abroad; for while the people were all armed in their common defence, individuals were also properly guarded against the attacks of despotism. The power of the chiefs who formed a regular nobility, was a counterpoise to that of the sovereign; while the number of the retainers and vassals, constituting the greatness and power of the nobility, was a proper barrier against aristocratical oppression; for a chief who oppressed his vassals evidently acted against his own interest.

Feodal. Thus the landed property was every where changed into feudal tenures, and fiefs became universal (c).

For some time the feudal system was not only useful in itself, but honourable in its principles; but this continued no longer than while the importers of it into Europe adhered to their original simple and noble maxims. During that period, the lord exercised his bounty to the vassal, which the latter repaid by acts of gratitude; so that the intercourse betwixt them was of the most tender and affectionate kind; and this gave rise to what are called the *feodal incidents*.

The expectants of fiefs were educated in the hall of the superior, while the tenures were precarious or only for life: and even when they became hereditary, the lord took care of the son and estate of his deceased vassal; not only protecting his person, but taking charge of his education, and directing the management of his affairs. He took pleasure in observing his approach to maturity; and when he came of age, never failed to deliver to him the lands, with the care of which he had been entrusted, and which he had been

careful to improve. This was called the *incident of wardship*.

The incident of *relief* was founded upon the gratitude of the vassal; who, upon entering on his fief, brought a present to his lord, as an acknowledgment of his care of him during the early part of his life, and in order to conciliate his future regard.

The incident of *marriage* proceeded also upon the principle of gratitude on the part of the vassal. The latter, conscious of the favours he had received, did not choose to ally himself with a family inimical to his chief: while the superior himself, ambitious to aggrandise and augment the importance of his family, sought how to find the most advantageous match for his vassal.

Sometimes the superior himself was reduced in his circumstances by war or other accidents: but from whatever cause his distress proceeded, even though it had arisen from his own extravagance or prodigality, or when only destitute of means to support his ambition or grandeur, his vassals were bound to support and relieve

(c) It has been an object of inquiry to the learned, in what nation of barbarians fiefs had their origin? But it is probable, that they took place in all of these nations nearly about the same time, on the same principles, and were continued by reason of a similarity of manners, conquests, &c. so that we cannot ascribe the prevalence of them to imitation.

In France, we find mention made of fiefs as early as the age of Childebert. They were introduced into Italy by the Lombards; among whom the customs and laws relating to fiefs seem very early to have made rapid advances*. They were introduced into Spain before the invasion of the Moors or Saracens in the year 710. Lands were granted for service and attachment among the Goths; among whom also the person who received the gift was the retainer of him who granted it. If he refused his service, the grant was forfeited, and he was said to receive it *in patrocinio*: he also swore fealty to his lord; and on this footing the national militia was regulated†. There can be very little doubt that the feudal law was known in England in the Saxon times, as is mentioned in the text‡. In Scotland, however, the history of fiefs is still more uncertain than any where else; which has been ascribed partly to the mutilated state of the Scottish records, and partly to the want of able antiquaries in the nation. But, according to a late writer||, allodiality and feudality have existed ever since the foundation of the Scottish monarchy, and have most probably arisen from a similarity of the manners and customs in Scotland to those of other nations. It has indeed been supposed, that these customs were introduced from some foreign model by Malcolm II. According to some, they were introduced directly from England; and the policy of Malcolm in establishing them has been highly extolled: but, according to our author, there is no foundation for any notion of that kind. Both the opinions just mentioned either directly assert or imply, that the feudal maxims were introduced into that country upon the principle of imitation; but it is very improbable that they could be imported from one people to another, on account of their excessive contrariety to the common usages and precepts of government among mankind. It must undoubtedly have been very absurd, if not altogether impracticable, to transplant the feudal tenures when the grants of land were precarious, or depending entirely on the will of the prince, to a country which had never known superiority or vassalage. This would have required an alteration of all the orders of society from the king to the peasant; while the whole chain of customs, as well as the jurisdiction of the kingdom, both high and low, must have sustained a corresponding alteration, in order to conform them to the new system. It is likewise obvious, that no conquest could be made on purpose to obtain a settlement by any nation who had already received the knowledge of fiefs. The establishment of them implied, that the people had already a fixed and settled residence; and accordingly history does not furnish us with any account of a nation among whom fiefs were known, who ever migrated from the country they already possessed, to seek for one in which they might settle. Feudal institutions must have originated wherever they have been observed to flourish. Scotland was formerly a feudal kingdom, and we know pretty nearly the time when the fiefs were hereditary there: but in that form they could not be introduced by the sovereign; and there was not any nation among whom fiefs were already known who conquered, or made an establishment by conquest, in Scotland. Fiefs therefore must have *gradually* advanced to such a state of perfection. The progress they made may be likewise easily pointed out. At first they were precarious, or at the pleasure of the lord; afterwards they were granted for life; then for a course of years longer than the natural life of a man; and, lastly, they became hereditary, which was their most perfect stage. This progress has been observed in every country where feudal tenures exist; and the same must have been known in Scotland, though in considering it we are necessarily carried back to periods of remote antiquity; for as fiefs were hereditary as early as the time of Malcolm II. they must have been in their precarious state several centuries before.

* Giannone
Hist. of
Naples,
book iv,
sect. 3.
† L. L. Wi-
gmoth, lib. v.
tit. 3.
lib. iv.
tit. 7. l. xx.
‡ See also
Whitaker's
Hist. of
Manchester.
|| Stuart's
Observat. on
the Law and
Constitution
of Scotland.

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lieve him according to their circumstances; and this was called the *incident of aid*.

The incident of *escheat* took place on the part of the vassal, when, through cowardice, treachery, or any remarkable misbehaviour, he rendered himself unworthy of his fief. In that case, the taking it from him, and giving it to one more worthy, was called an *escheat*.

8
Happiness
of the feo-
dal associ-
ation.

While the lords and vassals thus vied with one another in mutual acts of friendship and benevolence, universal happiness, liberty, and activity, were diffused through the society. The vassals behaved courteously towards the retainers, who were immediately below them; while they again were courted by the lords as constituting their importance and strength; the lords, lastly, giving a like importance and dignity to the sovereign himself. Thus a regular, powerful, and compact system of government took place; an unanimity and attention pervaded the various departments of state; so that while the subjects were free, the nation at large was formidable.

9
Its declen-
sion.

During this happy state of affairs, the members of the national assembly in every country in Europe appeared there in arms, whether they came personally or by their representatives. Such particularly was the case under the Anglo-Saxon government; and the happiness they at that time enjoyed made the oppression and tyranny of the Normans appear the more intolerable. In process of time, however, the state of society began to suffer a remarkable alteration. The high and disinterested notions, from which the happiness above mentioned took its origin, declined; the romantic ideas of chivalry * ceased; and much more interested notions of property came in their stead. The separation of the interests of the lords from their vassals was the first step towards the destruction of the feudal system.

* See Chi-
valry and
Knights.

10
The per-
version of
its inci-
dents:

Thus the *incidents*, which, as has just now been mentioned, promoted their happiness, did the very reverse. Property being now looked upon as a distinction superior to personal merit, naturally introduced the most mercenary views. In consequence of these, the infant ward, the care of whom was wont to be considered as a sacred and honorary trust, was now only looked upon as a mean of procuring emolument to the superior. The latter now regarded the profits of his vassals as so many diminutions of his own wealth. Instead of taking care to improve the estate of his ward as formerly, he impoverished it; not only neglecting the education of the heir, but offering insults to himself; insomuch that the relations of the unfortunate vassal were frequently obliged to ransom from the avaricious superior, both his person and effects. By merchandise of this kind the coffers of princes were filled, and wardships let out to strangers, who might exercise their rapacity with greater freedom. When the vassal at last attained the years of maturity, he came to the possession of his lands without any of that joy and festivity which usually took place on the occasion. He received an inheritance wasted and destroyed, while new grievances daily presented themselves to augment the horrors of his situation.

11
Oppressed
situation of
the vassals.

All the *incidents*, which in former times were so many expressions of gratitude on the part of the vassal, were now changed into taxes which might be exacted at the pleasure of the lord. Before the vassal was invested in his land, the superior exacted from him

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a certain sum or other gift, to be measured only by his own rapacity; and in case of delay or inability to pay this demand, the superior continued in possession of the estate. Such scandalous oppression could not but produce the greatest discontent and clamour. Applications were made to the law without success; nor were even the laws regarded which were fabricated on purpose for their relief. The incident of *marriage* now proved a source of the most dreadful oppression. The lord assumed the right of marrying his vassal to whom he pleased; and he not only exerted this right himself, but would sell it to a stranger, or allow the vassal to buy it himself; while the penalty annexed to a marriage without the consent of the superior involved no less punishment than the loss of the estate itself, or some grievous infliction as for a crime of the first magnitude. The case was still worse with a female ward; whose beauty and accomplishments became a source of gain to the superior, or were sacrificed to please his whim or caprice: so that her relations were frequently obliged to buy from him the privilege of marrying her to the person she or they thought most proper. In like manner the *aid*, which was formerly a voluntary gift from the vassal, in cases of distress happening to his lord, now became an unavoidable tax. An aid formerly was demanded when the eldest daughter of the superior was married, when his eldest son was knighted, or when the superior himself was taken prisoner in battle. These were the only legal causes of making a demand of this kind: but in the subsequent times of degeneracy, the most frivolous pretences were every day made use of by the prince to oppress the lords, and by the lords to oppress their vassals; demanding subsidies at pleasure, which their inferiors were always obliged to comply with. Lastly, the *escheat*, which in former times took place only in cases of cowardice, treachery, or some other heinous crime, was now inflicted on the most trifling occasions. If the vassal happened to be too long in attending the court of his superior to take the oath of fealty; if he committed any action which could in the least be construed an infringement of the oath; if he neglected to give his lord warning of any misfortune which he might suppose was about to befall him; revealed any thing concerning him; made love to his sister or daughter, &c.; or even if he should grant a tenure of land to another person in form different from that in which he held his own; all these, nay others still more ridiculous, were judged sufficient reasons for the superior to seize on the estate of the vassal, and involve him and his family in ruin.

Notwithstanding these oppressions, however, the vassal was still obliged to submit to his lord; to own him as his superior; and even, in appearance, to pay him the same respect as formerly when the greatest unanimity and cordial affection subsisted between them. Still he was obliged to perform the same military service; because a failure in that respect would have subjected him to a forfeiture of lands according to the original agreement. A vast difference, however, now took place in the valour and activity which inspired the army. The vassals, forced into the field with desponding hearts, were indifferent as to the success of the cause in which they were engaged, and frequently obstructed instead of forwarding the operations of the

Feodal-
System.

12
Consequent
degeneracy
of the feo-
dal militia.

D d

field.

Feodal
System.

13
Expedient
for its re-
covery.

14
Invention
of knight-
service.

field. Hence the sovereign found himself embarrassed; and, though nominally at the head of a martial and powerful people, was frequently unable to effect any thing by reason of the mutual hatred and dissension which every where prevailed.

Thus the feudal states of Europe became unnaturally weak: a remedy was necessary; and it is remarkable, that the same remedy was applied all over the continent. This was, in short, the making fiefs hereditary, which till now had only been granted for a long term of years: and, in return, burdening the lands with a certain number of soldiers, which were not to be refused upon any pretence whatever. Hence was derived the tenure of *knight-service*. A certain portion of land, burdened with the service of one soldier or knight, was called a *knight's-fee*; and thus an estate, furnishing any number of soldiers, was said to contain as many knight's fees; so that now the manours, baronies, &c. became powerful according to the number of soldiers they were bound to furnish. In the grants from the crown, the nobility were obliged to furnish a certain number of soldiers for the service of the sovereign; and in those from the nobility to their vassals, the like service was required. Even the commons who had grants from the crown, furnished a certain proportion of knights. The force of the nation was called into action by grants *in capite*, or from the sovereign and nobility. A numerous and powerful army was instantly assembled, and at once ready for action. Of this army the king was the general, the nobility the officers, and the vassals soldiers; the whole being exactly arranged, and capable of entering upon any expedition without the least delay.

Thus a remedy was found in some measure for the weakness of the feudal sovereigns: but though the knights-tenure could accomplish this, it could not bring back the former affection and cordiality which subsisted between the various ranks of people. On the contrary, by uniting them more firmly to one another by legal ties, it rendered matters rather worse. The oppression originating from the operation of the feudal incidents, still continued with unremitting violence. The grants of knights-tenure were attended with the same oaths

of homage and fealty; the same incidents of relief, wardship, marriage, aid, and escheat, with the feudal tenures. The princes promised to abate somewhat of their rigour in demanding the feudal perquisites, but did not keep their word. Laws were occasionally promulgated, and for some time had an effect; but palliatives soon became ineffectual, and a new state of weakness began to commence.

The two remarkable eras in the feudal history are, the time before the invention of knight-service (D), and that during which it continued. Fiefs were in a state of fluctuation from the destruction of the Roman empire till the ninth century; but they were rendered perpetual in France about the year 877, and were generally become so in every country of Europe about the beginning of the tenth. Du Cange, *voce Militia*, gives us an example of a knight-fee in the year 880. By the year 987, when Hugh Capet was raised to the throne of France; knight-service was become general all over Europe, and was introduced into England after having made its appearance in other countries (E). In England, however, there have been several doubts and inquiries among the learned concerning the introduction of the feudal laws. Many are of opinion, that they were first introduced by William the Conqueror; and, consequently, that they were entirely unknown to the Anglo-Saxons: but others think, that they existed among the latter in the same form under which they were continued by the Normans. Dr Stuart is of opinion, that the Saxons who settled in England could not be strangers to fiefs. He supposes the conformity of manners, which undoubtedly prevailed between the Saxons and other barbarians, a sufficient proof that the hereditary grant of land, as well as the fluctuating state of feudal tenures which preceded it, were known to the former. Collateral proofs are derived from the spirit and tenure of the Anglo-Saxon laws, but especially from the grants of hereditary estates on condition of military service (F). The condition of fiefs under the Anglo-Saxons was very different from what it was afterwards. In their times we find no mention made of those oppressions of which so much notice has already been

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System.

15
Two eras
in the histo-
ry of fiefs.

16
Doubts con-
cerning the
introduc-
tion of the
feodal laws
into Eng-
land.

(D) For the difference between the knights produced by this service and the more ancient ones, or knights of honour, see the article KNIGHT.

(E) Dr Stuart informs us, that it appears from the records of Malcolm IV. in 1153, that knights-service was known in Scotland, and that it was not a novelty at that time. The same author thinks it even probable that it was known in the time of David I.

(F) The use of intrails was known to the Anglo-Saxons; and this practice, as well as the succession to allodial estates, must have contributed very much to establish hereditary fiefs. This opinion seems also to be confirmed by the accounts we have of the great power of many of the nobility among the Anglo-Saxons, and the natural tendency that fiefs must have, in the course of things, to become perpetual, though analogical arguments cannot entirely be depended upon in this case. There is indeed positive evidence that the territory which anciently constituted the kingdom of Mereland belonged to Ethelred as an hereditary fief and earldom. The grant was given him by Alfred when he married his daughter Ethelfleda: and it is likewise attested by Camden, that in the time of Ethelred the earldom of Leicester was an inheritance, and the regular succession of its earls is still known. We are informed also by creditable historians, that Bernicia and Deireland were feudal and inheritable earldoms among the Saxons. The same was true of the county of Cumberland when possessed by the Scottish monarchs. This last appears from the Saxon Chronicle; in which the grant was conveyed by Edmund king of England to Malcolm of Scotland in the following terms; "Edmundus rex totam Cumberland prædavit et contrivit, et commendavit eam Malcom regi Scotiæ; hoc pacto, quod in auxilio sibi foret terra et mari." From the use of the word *commendavit*, indeed, Spelman takes occasion to say, that a feudal homage was not intended: but the contrary may be proved by the original Saxon from which the fore-
going

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been taken; and this may easily be accounted for from the alteration of the feudal spirit in different ages. During the time that a warm and generous affection subsisted between the feudal superiors and vassals, the incidents were marks of generosity on the one part, and gratitude on the other; but as soon as a variance had taken place, by reason of the interested disposition which the introduction of luxury produced, the same incidents became sources of the most flagrant oppression. This was remarkably the case in the time of William the Conqueror; and, during the reign of king John, matters were come to such a crisis, that the people every where complained loudly, and demanded the restoration of the laws of Edward the Confessor (c). "What these laws of Edward the Confessor were (says Mr Hume), which the English every reign during a century and an half desired so passionately to have restored, is much disputed by antiquarians; and our ignorance of them seems one of the greatest defects of the ancient English history." Dr Stewart has offered an explanation; but this is in fact no more than a conjecture, that "by the laws or customs of the Confessor, that condition of felicity was expressed which had been enjoyed during the fortunate state of the feudal association. The cordiality, equality, and independence, which then prevailed among all ranks in society, continued to be remembered in less prosperous times, and occasioned an ardent desire for the revival of those laws and usages which were the sources of so much happiness.

17
Insufficient
solution of
them by
Dr Stuart.

18
Distinction
concerning
fiefs in the
Anglo-
Saxon and
the Anglo-
Norman
times.

Besides the great distinction (of which an account has already been given) between the state of fiefs under the Anglo-Saxons and under the Normans, they were no less distinguished by the introduction of knight-service. Hitherto the refinement of the English had been obstructed by the invasion of the Danes, and the insular situation of the kingdom; but after the Norman conquest the fiefs were made perpetual. Still, however, the knight-fee and knight-service were altogether unknown. William, the sixth prince who enjoyed the duchy of Normandy, was well acquainted with every thing relating to fiefs; for that duchy had experienced all the variety incidental to them from the time of its being granted to Rollo by Charles the Simple in the year 912, to the year 1066, when Wil-

liam was put in possession of England by the battle of Hastings.

On his accession to the throne, a number of forfeitures took place among those who had followed the fortune of Harold. Their estates were to be disposed of at the pleasure of the conqueror; and it was natural to suppose that he would follow the method practised in his own country. Hence the origin of knight-service in England. A grant of land, to any person whatever, was estimated at a certain number of knights-fees; and each of these required the service of a knight. The grants of lands were even renewed to the old tenants under this tenure; so that by degrees the whole military people in the kingdom acquiesced in it. To accomplish this, *DOMESDAY Book* is supposed to have been compiled, which contained an exact account of all the landed property of the kingdom. Hence it is to be concluded, not that William introduced fiefs into England, as some have imagined, but that he brought them to their ultimate state of perfection by the introduction of knight-service. This is evident from the laws enacted during his reign. In these it is not only mentioned that knight-service was enacted, but that it was done expressly with the consent of the common council of the nation; which at that time was equivalent to an act of parliament (H).

The invention of knight-service proved generally agreeable; for as only few of the Anglo-Saxon fiefs were hereditary, the advancement of the rest to perpetuity, under the tenure of knight-service, must have been accounted an acquisition of some importance; as not only augmenting the grandeur and dignity of the sovereign, but securing the independence of the subject, and improving his property. In the happy state of the feudal association, there was indeed no necessity for the knight's fee; but when the discordance and oppression so often mentioned began to take place, it became then necessary to point out particularly every duty of the vassal, as well as of the lord; and this was fully done by the invention of knight-service. The nobles possessed duchies, baronies, and earldoms; which extensive possessions were divided into as many fees, each of them to furnish a knight for the service of the king, or of the superior: so that every feudal state could command a numerous army

Feodal-
System.

19
Introduc-
tion of
knight-ser-
vice into
England.

20
Idea of the
feodal mi-
litia.

D d 2

and

going is a Latin translation; and the word, according to several learned critics, signifies feudal homage with the most strict propriety. Thus Du Cange informs us, that *commendare se alicui* was the general expression for *faire l'hommage a un suzerain*.

(c) The laws which are now extant under the name of Edward, are generally allowed to be of doubtful authenticity; nor are they, even supposing them to be genuine, of any use in answering the present question. They determine indeed the existence of fiefs among the Anglo-Saxons: and Dr Stuart is of opinion, that the compilation which goes under the name of this prince, though posterior to the date it bears, nevertheless merits greater attention than has usually been bestowed upon it. M. Honard, a foreign lawyer, is the latest writer who has made it his study; but he is better acquainted with the Norman than the Anglo-Saxon customs.

(H) The following law of William the Conqueror not only makes express mention of the knight's fee and service, but alludes to a former law of William and his parliament, by which this tenure was actually established. "Statuimus etiam et firmiter præcipimus, ut omnes comites, et barones, et milites, et servientes, et universi liberi homines totius regni nostri prædicti, habeant et teneant se semper bene in armis et in equis, ut decet et oportet, et quod sint temper prompti et bene parati ad servitium suum integrum nobis explendum, et peragendum, cum semper opus adfuerit, secundum quod nobis debent de feodis et tenementis suis de jure facere, et sicut illis statuimus per commune consilium totius regni nostri prædicti, et dedimus et concessimus in feodo et jure hæreditario." L. L. Guill. c. 58.

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System.

and militia to support and defend it in case of any emergency. The knights were also bound to assemble in complete armour whenever the superior thought proper to call, and to hold themselves in readiness for action whenever the king or superior found it convenient to take the field: so that thus the militia might be marched at the shortest notice to defend or support the honour of the nation.

The knights were usually armed with an helmet, sword, lance, and shield; and each was besides obliged to keep a horse. This last requisite was owing to the contempt into which the infantry had fallen through the prevalence of tournaments and luxuries of various kinds, though it was by means of the infantry that the barbarians had originally distinguished themselves in their wars with the Romans, and became able to cope with these celebrated warriors. All proprietors of fees or tenants by knight-service fought on foot: the cavalry were distinguished by the name of *battle*; and the success of every encounter was supposed to depend on them alone. They only were completely armed; the infantry, being furnished by the villages under the jurisdiction of the barons, had at first only bows and slings; though afterwards they were found worthy of much greater attention.

21
Its ineffica-
cy and cor-
ruption.

While the feudal association remained in perfection, the superior could at any time command the military service of his vassals; but in the subsequent degeneracy this service could neither be depended upon when wanted, nor was it of the same advantage when obtained as formerly. The invention of knight-service tended in a great degree to remedy this inconvenience. Those who were possessed of knights fees were now obliged to remain 40 days in the field at their own expence; and this without exception, from the great crown vassals to the smallest feudatories; but if longer service was required, the prince was obliged to pay his troops. In those times, however, when the fate of nations was frequently decided by a single battle, a continuance in the field for 40 days was sufficient for ordinary occasions.

Thus matters seemed once more to be restored nearly to their former state. It was now, as much as ever, the interest of the nation to act with unanimity in its defence, not only against foreign enemies, but against the tyranny of the prince over his subjects, or of one part of the subjects over the other. New inconveniences, however, soon began to take place, owing to the gradual improvement in life and the refinement of manners. From the first institution of military service, a fine had been accepted instead of actual appearance in the field. In the times of barbarity, however, when men accounted rapine and bloodshed their only glory, there were but few who made an offer of this compensation; but as wealth and luxury increased, and the manners of people became softer, a general unwillingness of following the army into the field became also prevalent. A new tenure, called *escuage*, was therefore introduced; by which the vassal was only obliged to pay his superior a sum of money annually instead of attending him in the field*. Hence originated taxes and their misapplication; for as the king was lord paramount of the whole kingdom, it thence happened that the whole *escuage* money collected

* See the
particular
consequen-
ces of this
under the
article
*Knight-
Service*.

throughout the nation centred in him. The princes then, instead of recruiting their armies, frequently filled their coffers with the money, or dissipated it otherwise, hiring mercenaries to defend their territories when threatened with any danger. These being composed of the dregs of the people, and disbanded at the end of every campaign, filled all Europe with a disorderly banditti, who frequently proved very dangerous to society. To avoid such inconveniences, standing armies were introduced, and taxations began to be raised in every European kingdom. New inconveniences arose. The sovereigns in most of these kingdoms, having acquired the right of taxation, as well as the command of the military power, became completely despotic: but in England the sovereign was deprived of this right by Magna Charta, which was extorted from him, as related under the article ENGLAND, [n° 153]; so that, though allowed to command his armies, he could only pay them by the voluntary contributions of the people, or their submitting to such taxations as were virtually imposed by themselves.

FEOFFMENT, in law, (from the verb *feoffare* or *infeudare*, "to give one a feud"); the gift or grant of any corporeal hereditament to another. He that so gives, or enfeoffs, is called the *feoffer*; and the person enfeoffed is denominated the *feoffee*.

This is plainly derived from, or is indeed itself the very mode of, the ancient feudal donation; for though it may be performed by the word "enfeoff" or "grant," yet the aptest word of feoffment is *do* or *dedi*. And it is still directed and governed by the same feudal rules; inasmuch that the principal rule relating to the extent and effect of the feudal grant, *tenor est qui legem dat feudo*; is in other words become the maxim of law with relation to feoffments, *modus legem dat donationi*. And therefore, as in pure feudal donations, the lord, from whom the feud moved, must expressly limit and declare the continuance or quantity of estate which he meant to confer, *ne quis plus donasse presumatur, quam in donatione expresserit*; so, if one grants by feoffment lands or tenements to another, and limits or expresses no estate, the grantee (due ceremonies of law being performed) hath barely an estate for life. For, as the personal abilities of the feoffee were originally presumed to be the immediate or principal inducements to the feoffment, the feoffee's estate ought to be confined to his person and subsist only for his life; unless the feoffer, by express provision in the creation and constitution of the estate, hath given it a longer continuance. These express provisions are indeed generally made; for this was for ages the only conveyance, whereby our ancestors were wont to create an estate in fee-simple, by giving the land to the feoffee, to hold to him and his heirs for ever; though it serves equally well to convey any other estate of freehold.

But by the mere words of the deed the feoffment is by no means perfected: there remains a very material ceremony to be performed, called *livery of seising*; without which the feoffee has but a mere estate at will. See SEISIN.

FERÆ, in zoology, an order of quadrupeds. See ZOOLOGY.

FERALIA, in antiquity, a festival observed among

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Feralia.
22
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standing
armies, &c.

Feralia
Feretrum.

mong the Romans on February 21st, or, according to Ovid, on the 17th of that month, in honour of the manes of their deceased friends and relations.

Varro derives the word from *inferi*, or from *fero*; on account of a repast carried to the sepulchres of such as the last offices were that day rendered to. Festus derives it from *ferio*, on account of the victims sacrificed, Vossius observes, that the Romans called death *fera*, "cruel," and that the word *feralia* might arise thence. —Macrobius Saturn. lib. i. cap. 13. refers the origin of the ceremony to Numa Pompilius. Ovid, in his Fasti, goes back as far as Æneas for its institution. He adds, that on the same day a sacrifice was performed to the goddess Muta, or Dumb; and that the persons who officiated were an old woman attended with a number of young girls.

During the continuance of this festival, which lasted eleven days, presents were made at the graves of the deceased, marriages were forbidden, and the temples of the gods shut up. While the ceremonies continued, they imagined that the ghosts suffered no punishments in hell, but that their tormentors allowed them to wander round their tombs, and feast upon the meats which their surviving friends had prepared for them. —For a more particular account of the offerings and sacrifices and feasts for the dead, see *INFERNÆ* and *SILICERNIUM*.

Sometimes at the *feralia* public feasts were given to the people at the tombs of the rich and great by their heirs or particular friends.

FER DE FOURCHETTE, in heraldry, a cross having at each end a forked iron, like that formerly used by soldiers to rest their muskets on. It differs from the cross-fourché, the ends of which turn forked; whereas this has that sort of fork fixed upon the square end. See *HERALDRY*.

FER de Moulin, Mitrinde, Inke de Moulin, in heraldry, is a bearing supposed to represent the iron-ink, or ink of a mill, which sustains the moving mill-stone.

FERDINAND V. king of Spain, called *the Catholic*, which title was continued to his successors. He married Isabella of Castile, by which that kingdom was united to the Spanish crown. This illustrious couple laid the foundation of the future glory and power of Spain. The conquest of Granada, and the discoveries of Christopher Columbus, make this reign a celebrated era in the history of Spain. He died in 1516, aged 63. See (*History of*) *SPAIN*.

FERENTARII, in Roman antiquity, were auxiliary troops, lightly armed; their weapons being a sword, bow, arrows, and a sling.

FERENTINUM, (anc. geog.), a town of the Hernici in Latium, which the Romans, after subduing that nation, allowed to be governed by its own laws. Now *Ferentino*, an episcopal city in the Campania of Rome. E. Long. 14. 5. N. Lat. 41. 45.

FERENTUM, or *FORENTUM*, (anc. geog.), a town of Apulia in Italy. Now *Forenza*, in the Basilicata of Naples.

FERETRIUS, a surname of Jupiter, *a ferendo*, because he had assisted the Romans; or *a feriendo*, because he had conquered their enemies under Romulus. He had a temple at Rome built by Romulus. It was there that the spoils called *opima* were always carried.

FERETRUM, among the Romans, the bier used

in carrying out the bodies of the dead, which duty was performed by the nearest male relations of the deceased: thus, sons carried out their parents, brothers their sisters, &c.

FERG, or *FERGUE*, (Francis Paul), a charming landscape-painter, was born at Vienna in 1689, and there learned the first principles of his art. He successively practised under Hans Graf, Orient, and Thiele. This last, who was painter to the court of Saxony, invited him to Dresden to insert small figures in his landscapes. Ferg thence went into Lower Saxony, and painted for the duke of Brunswick and for the Gallery of Salzdahl. From Germany he went to London, where he might have lived in the highest esteem and affluence, if, by an indiscreet marriage, he had not been so effectually depressed, that he was ever after involved in difficulties. The necessities which arose from his domestic troubles, compelled him to diminish the prices of his paintings, in order to procure an immediate support; and as those necessities increased, his pictures were still more sunk in their price, though not in their intrinsic value. By a series of misfortunes he was over-run with debts; and to avoid the pursuit of his creditors, he was constrained to secrete himself in different parts of London. He died suddenly in the street one night as he was returning from some friends about the year 1738, having not attained his 50th year: and left four children. This pleasing artist, Mr Walpole observes, had formed a manner of his own from various Flemish painters, though resembling Poelemburg most in the enamelled softness and mellowness of his colouring: but his figures are greatly superior; every part of them is sufficiently finished, every action expressive. He painted small landscapes, fairs, and rural meetings, with the most agreeable truth; his horses and cattle are not inferior to Wouvermans; and his buildings and distances seem to owe their respective softness to the intervening air, not to the pencil. More faithful to nature than Denner, he knew how to omit exactness, when the result of the whole demands a less precision in parts. The greatest part of his works are in London and Germany; and they now bear such a price as is the most indubitable evidence of their real merit. He also etched well with aquafortis; and his prints of that kind are esteemed by the curious.

FERGUS, the name of three kings of Scotland. See (*History of*) *SCOTLAND*.

FERGUSON (James), an eminent experimental philosopher and mechanic, was born in Scotland, of very poor parents. At the earliest age his extraordinary genius began to exert itself. He first learned to read, by overhearing his father teach his elder brother; and he had made this acquisition before any one suspected it. He soon discovered a peculiar taste for mechanics, which first arose on seeing his father use a lever. He pursued this study a considerable length, even whilst very young; and made a watch in wood-work, from having once seen one. As he had no instructor, nor any help from books, every thing he learned had all the merit of an original discovery; and such, with infinite joy, he believed it to be. As soon as his age would permit, he went to service; in which he met with hardships, which rendered his constitution feeble through life. Whilst he was servant to a farmer (whose

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(whose goodness he acknowledges in the modest and humble account of himself which he prefixed to his last publication), he frequently contemplated the stars; and began the study of astronomy, by laying down, from his own observations only, a celestial globe. His kind master, observing these marks of his ingenuity, procured him the countenance and assistance of his superiors. By their help and instructions, he went on gaining farther knowledge, and was sent to Edinburgh. There he began to take portraits; an employment by which he supported himself and family for several years, both in Scotland and England, whilst he was pursuing more serious studies. In London he first published some curious astronomical tables and calculations; and afterwards gave public lectures in experimental philosophy, which he repeated (by subscription) in most of the principal towns in England, with the highest marks of general approbation. He was elected a Fellow of the Royal Society, without paying for admission (an honour scarcely ever conferred on a native); and had a pension of 50 l. *per ann.* given him, unsolicited, by the king, at his accession, who had heard lectures from him, and frequently sent for and conversed with him on curious topics.—He also received several presents from his majesty, the patron of real merit. To what a degree of consideration Mr Ferguson mounted by the strength of his natural genius, almost every one knows. He was universally considered as at the head of astronomy and mechanics in that nation of philosophers. And he might justly be styled self-taught, or rather heaven-taught; for in his whole life he had not above half a year's instruction at school. He was a man of the clearest judgment, and the most unwearied application to study; benevolent, meek, and innocent in his manners as a child: humble, courteous, and communicative; instead of pedantry, philosophy seemed to produce in him only diffidence and urbanity,—a love for mankind and for his Maker. His whole life was an example of resignation and Christian piety. He might be said to be an enthusiast in his love of God, if religion, founded on such substantial and enlightened grounds as his was, could be styled enthusiasm. He died in 1776.

FERIÆ, in Roman antiquity, holidays, or days upon which they abstained from work. Proclamation was generally made by the herald, by command of the *Rex Sacrorum*, or *Flamines*, that all should abstain from business; and whoever transgressed the order was severely fined.—The feriae were of two kinds, public and private.

The *public* Feriæ were fourfold. 1. *Stativæ*, which were kept as public feasts by the whole city upon certain immoveable days appointed in their kalendar;—such were the *Compitalia*, *Carmentalia*, *Lupercalia*, &c. 2. *Feria Conceptivæ*, which were moveable feasts, the days for the celebration of which were fixed by the magistrates or priests: of this sort were the *Feria Latina*, *Paganalia*, *Compitalia*, &c. which happened every year, but the days for keeping them were left to the discretion of the magistrates or priests. 3. *Feria Imperativæ*, which were fixed and instituted by the mere command of consuls, prætors, dictators, upon the gaining of some victory or other fortunate event. 4. *Nundinæ*. See the articles NUNDINÆ, AGONALIA, CARMENTALIA, &c.

The *private* Feriæ were holidays observed by particular persons or families on several accounts, as birthdays, funerals, &c. The feriae belonged to, and were one division of, the *dies festi*. See FESTI.

FERIÆ *Latinae*, a festival at which a white bull was sacrificed, and the Latin and Roman towns provided each a set quantity of meat, wine, and fruits; and during the celebration, the Romans and Latins swore eternal friendship to each other, taking home a piece of the victim to every town. The festival was instituted by Tarquinius Superbus when he overcame the Tuscans and made a league with the Latins, proposing to build a common temple to Jupiter Latialis, at which both nations might meet and offer sacrifices for their common safety. At first the solemnity lasted but one day, but it was at different times extended to ten. It was held on the Alban mount, and celebrated with chariot races at the capitol, where the victor was treated with a large draught of wormwood drink.

FERIA, in the Romish breviary, is applied to the several days of the week; thus Monday is the *feria secunda*, Tuesday the *feria tertia*; though these days are not working days, but holidays. The occasion of this was, that the first Christians were used to keep the easter-week holy, calling Sunday the *prima feria*, &c. whence the term *feria* was given to the days of every week. But besides these, they have extraordinary feriae, viz. the three last days of passion-week, the two following easter-day, and the second feriae of rogation.

FERIANA, the ancient city of Thala in Africa, taken and destroyed by Metellus in the war with Jugurtha. It was visited by Mr Bruce in his late travels through Africa, who expected to have found many magnificent ruins in the place, but was disappointed. The only remarkable objects he met with were the baths, which are excessively warm. These are without the town, and flow from a fountain named *El Tarmid*. Notwithstanding the excessive heat of its water, the fountain is not destitute of fishes. They are of the shape of a gudgeon, above four inches in length; and he supposed that there might have been about five or six dozen of them in the pool. On trying the water with a thermometer, he found the heat so great, that he was surprised the fish were not boiled in it. That fish should exist in this degree of heat, is very surprising; but it seems no less wonderful that Mr Bruce, while standing naked in such water, should leisurely make observations on its heat, without suspecting that he himself would be boiled by continuing there. We have to regret that the accidental wetting of the leaf on which he wrote down his remarks has deprived the public of the knowledge of the precise degree to which the thermometer is raised by this water. The fish are said to go down the stream to some distance during the day, and to return to the spring or warmest part at night.

FERMANAUGH, a county of Ireland, in the province of Ulster; bounded by Cavan on the south, Tir-Oen on the north and north-east, by Tyrconnel on the north-west, Leitrim on the south-west, and Monaghan on the west. It is 38 miles long and 24 broad. A great part of it is taken up with bogs; and the great lake called *Lough-Earne*, which is near 20 miles in length, and in some places 14 in breadth, diversified with upwards of 300 islands, most of them well wooded,

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ed, inhabited, and covered with cattle. It abounds also with great variety of fish, such as huge pike, large bream, roach, eels, trout, and salmon. The water of the lake in some places is said to have a particular softness and liminess, that bleaches linen much sooner than could be done by other water. The lake is divided into the Upper and Lower, between which it contracts itself for five or six miles to the breadth of an ordinary river. In one part of the county are marble rocks 50 or 60 feet high. This county sends four members to parliament, viz. two for the shire, and two for Inniskillen the capital. Fermanagh gives the title of viscount to earl Verney.

FERMENT, any body which being applied to another, produces fermentation.

Ferments are either matters already in the act of fermentation, or that soon run into this act. Of the first kind are the flowers of wine, yeast, fermenting beer, or fermenting wine, &c. and of the second are the new expressed vegetable juices of summer fruit.

Among distillers, ferments are all those bodies which, when added to the liquor, only correct some fault therein, and, by removing some obstacle to fermentation, forward it by secondary means: as also such as, being added in time of fermentation, make the liquor yield a larger proportion of spirit, and give it a finer flavour.

FERMENTION, may be defined a sensible internal motion of the constituent particles of a moist, fluid, mixed or compound body; by the continuance of which motion, these particles are gradually removed from their former situation or combination, and again, after some visible separation is made, joined together in a different order and arrangement, so that a new compound is formed, having qualities very sensibly different from those of the original fluid.

I
Subjects of
fermenta-
tion.

Fermentation, properly so called, is confined to the vegetable and animal kingdoms; for the effervescences between acids and alkalis, however much they may resemble the fermentation of vinous liquors, are nevertheless exceedingly different. It is divided into three kinds; or rather, there are three different stages of it, viz. the vinous, the acetous, and the putrefactive. Of the first, vegetables alone are susceptible; the flesh of young animals is in some slight degree susceptible of the second (A); but animal substances are particularly susceptible of the third, which vegetables do not so easily fall into without previously undergoing the first and second. The produce of the first stage is wine, or some other vinous liquor; of the second, vinegar; or of the third, volatile alkali. See **BREWING, VINEGAR, &c.**

Fermentation is one of the most obscure processes in nature, and no attempt has been made to solve it with any degree of probability. All that we know with regard to it is, that the liquor, however

clear and transparent at first, no sooner begins to ferment, than it becomes turbid, deposits a sediment, emits a great quantity of fixed air, and throws up a scum to the top, acquiring at the same time some degree of heat. The heat of the vinous stage, however, is but moderate, seldom or never exceeding that of the human body. The heat of the acetous is considerably greater; and that of the putrefactive is the greatest of all, inasmuch that putrefying substances, when heaped together in great quantities, will sometimes break forth into actual flame.

From these phenomena, fermentation would seem to be a process ultimately tending to the entire dissolution of the fermenting substance, and depending upon the action of the internal heat, etherial fluid, or whatever else we please to call it, which pervades, and makes an essential ingredient in, the composition of all bodies. From such experiments as have been made upon this subject it appears, that whether fixed air is the bond of connection between the particles of terrestrial bodies or not, yet the emission of it from any substance is always attended with a dissolution of that substance. We cannot, however, in the present case, say that the emission of the fixed air is the *cause* of the fermentation. It is in fact otherwise. Fixed air hath no tendency to fly off from terrestrial substances with which it is united; on the contrary, it will readily leave the atmosphere after it hath been united with it, to join itself to such terrestrial substances as are capable of absorbing it. The emission of it, therefore, must depend upon the action of some other fluid; most probably the fire or heat, which is dispersed thro' all substances in a latent state, and in the present case begins sensibly to manifest itself. But from what cause the heat originally begins to operate in this manner, seems to be entirely unknown and inexplicable, except that it appears some how or other to depend on the air; for, if that is totally excluded, fermentation will not go on.

In the Memoirs of the Manchester Society, Mr Henry gives an account of some experiments, in which he produced fermentation not only in bread and wort, but in liquors which we should think quite incapable of it, viz. punch and whey. Having previously suspected, from some observations and experiments, that yeast was only a quantity of fixed air involved and detained among the mucilaginous parts of the fermenting liquor, he attempted to prepare it in the following manner. Having boiled wheat-flour and water to the consistence of a thin jelly, he put this viscous fluid into the middle part of Dr Nooth's machine for impregnating water with fixed air. The gas was absorbed in considerable quantity; and next day the matter was in a state of fermentation. The third day it had acquired so much of the appearance of yeast, that an experiment was made on some paste for bread; and after five or six hours baking it

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Mr Henry's
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on producing
fermentation
by impregnating
the liquor
with fixed
air.

(A) Under the article **CHINA**, n^o 114. a fact is mentioned which seems to show that animal substances are likewise capable of the vinous fermentation; viz. that the Chinese make use of a certain liquor called *lamb-wine*, and likewise that they use a kind of spirit distilled from *sheep's flesh*. This is related on the credit of M. Grosier: but as he does not mention the particulars of the process, we are at liberty to suppose that the flesh of these animals has been mixed with rice, or some other ingredients naturally capable of producing a vinous liquor; so that, instead of contributing any thing to the fermentation in question, they may in reality be detrimental, and furnish only that strong and disagreeable smell complained off in the liquid.

Fermenta-
tion.

it was found to have answered the purpose tolerably well. Another experiment was made with wort; but here the artificial yeast was not made use of. Instead of this, part of the wort itself was put into Nooth's machine, and impregnated with fixed air, of which it imbibed a large quantity. On being poured into the remainder of the liquor, a brisk fermentation came on in 24 hours, "a strong head of yeast began to collect on its surface, and on the third day it seemed fit for tunning." In prosecuting the experiment, good bread was made with the yeast taken off from the surface; and beer was produced by keeping the fermented liquor, and good ardent spirit produced by distilling it. In another experiment, in which a fourth part of the wort was impregnated but not saturated with fixed air, the fermentation did not commence so soon, though it is probable that it would also have taken place at last without any farther addition. The experiment commenced about midnight; but in the morning there were no signs of fermentation. At five in the afternoon there was only a slight *mantling* on the surface. A bottle with a perforated stopper and valve containing an effervescing mixture of chalk and vitriolic acid was then let down to the bottom of the vessel; the discharge of air from this mixture was going on rapidly at nine o'clock; while the liquor at the same time seemed to be in a state of effervescence. At 11 o'clock the bottle was withdrawn, as the fermentation was commenced beyond a doubt, the liquor, having a pretty strong head of yeast upon it. Next day the fermentation seemed to be on the decline, but was recovered by a second immersion of the mixture. When the vinous fermentation was finished, the liquor, by being kept too long, was found converted into vinegar; so that in the course of these experiments, ale, bread, yeast, ardent spirit, and vinegar had all been produced.

5
Remarks
on them.

From these experiments it would seem natural to suppose that fixed air was the *cause* of fermentation, contrary to what has been already laid down. But in fact there is not any contradiction here to the position just mentioned; for the quantity of fixed air introduced into the liquor in Mr Henry's experiments was too great for it to contain. Some part of the latent heat by which the elasticity of that fluid is produced may likewise have been absorbed, and disposed the liquor to run into the fermenting state sooner than it would otherwise have done. Or, perhaps, when any fluid substance of the aqueous kind contains an extraordinary proportion of fixed air, it may be thus inclined to run into the fermentative process, by some disposition of the air itself to reassume its elastic state. This seems probable from Mr Henry's experiments with Pyrmont water. Having made some punch with an artificial water of this kind, he put a pint of it into a quart bottle and stopped it with a cork. On opening it three or four days after, he found that it creamed and mantled like the briskest bottled cyder; so that it was taken for some delicious liquor hitherto unknown. This length of time he found was necessary to give the briskness just mentioned to the fluid; for artificial Pyrmont water itself assumes a brisk and sparkling appearance after being kept three or four days, though it has it not at first, unless a very great quantity of air be forced into it at its preparation. In like manner a quan-

tity of whey, impregnated with fixed air, was changed into a brisk and sparkling vinous liquor by keeping for some time in a bottle loosely corked.

On certain substances, however, both fluid and solid, fixed air hath a different effect. Thus, when mixed with alkaline salts, whether fixed or volatile, fluid or solid, it first neutralises, and then renders them acid, without the least tendency to fermentation, unless an acid be added. Then indeed a great effervescence will ensue; but this, as we have already said, is not a true fermentation. On calcareous earths its effect is somewhat singular: for these earths, when pure, are soluble in water; when joined with a certain proportion of fixed air, they become insoluble; and with an over-proportion they become soluble again; but none of them show any disposition to fermentation, though kept ever so long in either state. As water therefore contains a great quantity of latent heat which it readily parts with, the probability still is that a disposition to unite with the solid part of fixed air exists in that element, rather than to remain combined with the water. It is likewise well known that all fermentable substances, such as the juices of ripe fruits, sugar, &c. contain much fixed air, and therefore fall spontaneously into fermentation when kept in a gentle warmth. This last circumstance supplies a quantity of sensible heat, or elementary fire acting in its expansive form, which the water more readily parts with than that which acts upon its own particles in such a manner as to keep them easily moveable upon one another, and thus occasion its fluidity. Other substances contain less fixed air, as infusion of malt, potatoes, turnips, &c. whence it is necessary to add an extraordinary quantity to them, either enveloped in mucilaginous matter which is analogous to yeast, or pure as was done by Mr Henry.

Thus we may suppose fermentation, to consist in the action of elementary fire expanding the fixed air naturally contained in the fluid, or artificially introduced into it; in consequence of which certain changes are produced in the nature of the fluid itself; and it becomes a vinous, acetous, or putrid liquor, according to the degree of action which takes place. This seems to coincide with the opinion of Dr Penington of Philadelphia, who, in his inaugural dissertation on this subject, makes a change of the sensible qualities of the substance the only criterion of fermentation. Hence he denies that any true fermentation exists in the raising of bread as is commonly supposed; and indeed his arguments on this subject seem decisive. To ascertain this, he put into a retort some dough which had been raised in three quarters of an hour; and, on applying a gentle heat, some aqueous liquid came over, which did not show the least vestige of vinous spirit, though the remainder of the same dough afforded a good and well fermented bread. On adding a little water to the dough which remained in the retort, and letting the mixture stand in a gentle warmth for nine hours, no sign of fermentation appeared; but in 16 hours the process seemed to have been going on for some time; and on distillation yielded a small quantity of vinous spirit. Hence it appears that flour requires more than nine hours before it ferments; but as bread frequently rises in one hour, the processes must some how or other be essentially different." From a variety of facts (says our author),

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Fermenta-
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His expla-
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the process

thor), I am induced to give the following explanation of the process (making of bread). Yeast is a fluid containing a large quantity of fixed air or aerial acid; and the proportion is greater as the fluid is colder. As soon as the yeast is mixed with the dough, heat is applied; this extricates the air in an elastic state; and as it is now diffused through every particle of dough, every particle must be raised; the viscosity of the mass retains it: it is now baked, and a still greater quantity of air is extricated by the increased heat; and as the crust forms, the air is prevented from escaping; the water is dissipated: the loaf is rendered somewhat dry and solid; and between every particle of bread we find a particle of air, as appears from the spongy appearance of the bread, owing to the apparent vacancies which the air had made by insinuating itself into it." This explanation he finds also confirmed by what is called the *falling* of bread after it has once been raised; and which takes place so rapidly, that we cannot suppose the process of fermentation to have been finished in the time: nay, bread will fall before we are warranted from his experiment to say that the fermentation is well begun; for this, as we have seen, required between 9 and 16 hours.

That bread is raised, not by a proper fermentation, but by a mere effervescence or escape of fixed air, is likewise evident from several facts mentioned by Dr Pennington. In Philadelphia, the bakers find some difficulty in getting good yeast in the summer-time, on account of the heat of the weather, which very soon turns it sour. In this case, they dissolve a small quantity of potash in water, and mix it with their yeast; when the effervescence produced between the acid and alkali produces such a discharge of fixed air, as raises the bread in less than ten minutes. He informs us also, on the authority of Dr Rush, professor in the college of Philadelphia, that "near Saratoga there are two mineral springs, the waters of which have all the properties of the famous Pyrmont water, being highly impregnated with fixed air. When this water is mixed with flour into dough, it is sufficient, without yeast, to make a very light and palatable bread." A third fact is still more decisive. "I procured (says the Doctor) some nice crystals of the salt formed by the fossil alkali and fixed air, and dissolved them in water sufficient to make a small loaf of bread. To this I added a little of the marine acid, commonly called spirit of sea-salt; fixed air was generated, but was absorbed by the cold water; it was then mixed with flour, set in a warm place to rise, and shortly after baked; and I had the exquisite pleasure to obtain a tolerably light loaf of bread, such as any one would have supposed to have been fermented, which was seasoned by the sea-salt; formed by the union of the fossil alkali and spirit of sea-salt; whilst the fixed air of the fossil alkali was disengaged, in order to raise it.

9
Other facts
in confir-
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his opinion.

To these instances mentioned by our author we shall add two others, which show that fixed air is not even necessary to the raising of bread; and of consequence we cannot suppose that fermentation, which produces a great quantity of it, is the foundation of the process. One is, that eggs, when beaten into a froth, are sometimes made use of for raising bread; but more especially for puddings, &c. in which they perform an

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operation similar to that of raising and rendering bread light and spongy. This is done by the rarefaction of the particles of air enveloped among the glutinous particles of the egg: and hence snow, on account of its porous and spongy nature, containing a great quantity of air enveloped among its particles, will do the same thing. This last particular was lately published by Dr Rotheram of Newcastle.

With regard to the other experiments of Mr Henry, they seem to Dr Pennington not to be altogether conclusive. He doubts the justice of Mr Henry's idea, "that wort cannot be brought into the vinous fermentation without the addition of a ferment." When we consider the analogy betwixt the infusion of malt and other fermentable liquids, the Doctor supposes that wort, as well as they, might spontaneously fall into a state of fermentation. He says indeed, that he has not yet been able to disprove the idea by experiment: but Captain Cook has already made the experiment, and the event has decided the matter in the Doctor's favour*. We are told by that celebrated navigator, that the inspissated wort would have answered the purpose excellently, provided it could have been kept from fermentation in its inspissated state. But this was found impossible; of consequence we must conclude, that wort, as well as other liquors, will fall into a state of fermentation spontaneously, though perhaps not so readily, or with such a small degree of heat, as other fermentable liquors. Hence we are not altogether certain, as Dr Pennington hints, whether the fermentation in Mr Henry's experiments might not have taken place without it. "In the memoir (Mr Henry's) abovementioned, says the Doctor, the author seems to think, that *fixed air* is the true cause of fermentation in vinous liquors; and he tells us of the excellent taste afforded to punch by being impregnated with it. Fixed air, it is well known, improves the *taste* of liquors; but we cannot suspect that it made the punch ferment in his experiment: but he tells us, that he had made an artificial yeast; that with this yeast he made beer (perhaps he might have made it without it) and vinegar; and that he fermented bread with it. As for its fermenting bread, we might readily allow that it would raise bread, upon the principles already laid down: and when he tells us how quick the fermentation takes place in his liquors when exposed to a gentle heat, may we not justly suppose, that the warmth extricated the fixed air that he had artificially combined with it, and that from this phenomenon alone he had supposed fermentation to be going on in them? Fixed air is the cause of the briskness, pungent taste, and sparkling appearance, of vinous liquors; and it is remarkable, that, in equal circumstances, the colder they are, the more air they contain. It is also a curious fact, that the fixed air in liquors must be in a peculiar state, otherwise they do not possess that briskness or pungency we spoke of; in fact, it must be on the point of assuming its elastic form; hence liquors are not so brisk in cold as in warm weather; and a connoisseur in port, for instance, will tell you, that a bottle shall open very briskly in a warm day; and upon the coming on of cold weather, all the rest shall be flat and dead; but let them be corked up and kept in a warm room for a few days, they will all recover their former briskness; nay, I

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His obser-
vations on
Mr Hen-
ry's experi-
ments.* See the
article *Cook*,
vol. v. p.
394. col. 2.

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tion.11
His theory
of fermenta-
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have seen a bottle opened in a cold day, that has been quite vapid, which was made brisk and lively by corking it up tight again, and setting it for ten or twelve minutes in a basin of water a little more than milk warm.

Our author's theory of fermentation is to the following purpose. 1. The heat occurring in the mixture, he explains on Dr Black's principle of latent heat. 2. In the fermenting process, he supposes the inflammable part of the mixture to have a tendency to combine with pure air, and thus to form what is called *fixed air*. 3. The pure air is supposed to be derived from the atmosphere, while inflammable air is furnished by the fermenting liquor. 4. The fixed air found in such plenty above the liquid while in a state of fermentation, does not exist in it originally, but is formed by a combination of the two ingredients just mentioned. 5. On these principles the heat which takes place in the mixture may be particularly explained in the following manner. "Suppose that the quantity of heat in the two airs before combination was in each as *ten*; or, in other words, that they were capable of containing that quantity in a latent state essential to their existence as matter in that form; when they unite, they form a very different kind of air, which is not capable of combining with so much heat, and perhaps quite foreign to its existence as that kind of matter: we will suppose then, that it can combine but with a quantity of that heat as *five*; the consequence must then be, that there is a quantity of redundant heat, as *fifteen*; and there being no bodies at hand undergoing any changes in their properties, by which their capacities to unite with heat as a principle are increased, it becomes *mechanically diffused* among those bodies which are nearest to it; it gives the redundant heat to the hand," &c.

12
General re-
mark.

We shall conclude this article with one obvious remark, viz. that the dispute concerning Mr Henry's method of inducing fermentation, may be easily decided by a comparative trial. Let, for instance, two gallons of wort, the quantity he used in his experiment, be put into a certain vessel without addition, and kept in a moderate heat for a certain time; take other two gallons, and impregnate the whole or any part of it with fixed air, according to Mr Henry's method: put the whole then into a vessel similar to the other, and set it in the same place; and if the fermentation begins in the one impregnated with fixed air sooner than the other, we have good reason to believe that the fixed air was the cause of its doing so. This experiment is easily made, and must be of considerable importance to the public: for as Mr Henry justly observes, his experiments "may be of extensive utility, and contribute to the accommodation, the pleasure, and the health of men in various situations, who have hitherto been precluded in a great measure from the use of fermented liquors; and be the means of furnishing important articles of diet and of medicine." Even as matters stand, we must consider this end as accomplished; though, if the mere circumstances of heat, without fixed air, would bring on fermentation, it would undoubtedly render the process considerably easier, by saving the trouble of impregnating the liquor with fixed air. With regard to bread, his method seems to be entirely decisive.

The business of fermentation is one of the great preparations to the distillery. What we usually call vinous fermentation in particular, is the kind in which it is principally concerned. By this we usually understand that physical action, or intestine commotion of the parts of a vegetable juice, tincture, or solution, which render them fit to yield an inflammable spirit on distillation.

This fermentation in the hands of the distiller differs from the common one that is used in the making of potable vinous liquors, as being much more violent, tumultuary, active, and combinatory than that. A large quantity of yeast, or other ferment, is added to the distiller's fermentation; the free air is admitted, and every thing is contrived to quicken the operation, so that it is sometimes finished in two or three days. This great dispatch, however necessary to the large dealer, has its inconveniencies attending it; for the spirit is by this means always fouler, more gross, and really terrestrial, than it would have been if the liquor had undergone a proper fermentation in a slower manner. It also suffers a diminution in its quantity, from the violent and tumultuary admission, conflict, and agitation of the free air, both in the body and upon the surface of the liquor, especially if the liquor be not immediately committed to the still as soon as the fermentation is fairly slackened or fully ended. It is a very difficult task to render the business of fermentation at once perfect and advantageous. To ferment, in perfection, necessarily requires length of time and careful attendance, and close vessels, besides several other articles of nice management, which cannot be expected to be received and practised in the large way, on account of the trouble and expence, unless it could be proved to the distillers, as possibly it some time may, that the quantity of spirit would be so much greater from the same quantity of materials managed thus, than by the common way, that it will more than pay its own expence: to which may be added, the very well known advantage of the spirit thus procured by perfect fermentation, being much finer than that obtained in the common way. Till this shall be made out, it may not be amiss to try how much of the more perfect art of vinous fermentation is profitably practicable by the distiller in the present circumstances of things. The improvements to be made in this affair will principally regard, 1. The preparation or previous disposition of the fermentable liquor. 2. The additions tending to the general or some particular end. 3. The admission or exclusion of the air. 4. The regulation of the external heat or cold. And, 5. A suitable degree of rest at last. When proper regard is had to these particulars, the liquor will have its due course of fermentation, and it will thence become fit to yield a pure and copious inflammable spirit by distillation. The tincture, solution, or liquor, intended for fermentation, for the still, should be considerably thin and aqueous. That sort of richness there is in the twelve-shilling small beer, is the utmost that ought to be allowed to it. This property not only fits it to ferment readily, but also to yield a larger quantity in proportion of a pure vinous spirit, than it would do if it were more rich or clammy: the gross, foul, viscid, and earthy particles of such glutinous liquors, being after fermentation apt to rise up with the boiling heat which

Fermenta-
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Fermenta-
tion.

which much necessarily be employed to raise the spirit ; and the spirit thus of course comes over foul and fetid. There is also another advantage attending the thinness of this liquor, which is, that it will sooner become fine by standing before fermentation ; whence it may be commodiously drawn off from its feces or bottom, which must always, in case of corn, malt, or any other meally substance, be kept out where the purity of the spirit is consulted. A certain degree of warmth seems necessary in all the northern climates, to all sorts of artificial liquors intended for immediate fermentation, especially in winter ; but the natural juices of vegetables, which have never been inspissated, as that of grapes and other fruits when fully ripened, will usually ferment, as soon as they are expressed, without any external assistance. But as a certain degree of inspissation prevents all tendency to fermentation in all vegetable juices, though otherwise strongly disposed to ferment ; so a long continuance, or an increase of the inspissating heat, especially if it acts immediately through a metalline or solid body upon the juice, will destroy its fermenting property ; and it will do this the more effectually, as the heat employed approaches to that of scorching, or the degree capable of giving an empyreuma—After the same manner, several experiments make it appear, that there is a certain degree of heat, the continuance or least increase of which proves detrimental or destructive to fermentation, as there is another which in a wonderful manner encourages and promotes it. These two degrees of heat ought to be carefully noted and settled by the thermometer, or other certain methods, for philosophical and chemical uses ; but for common, or all economical occasions, they may be limited to what we call a tepid and fervid heat. A fervid heat is the bane of all vinous fermentation ; as a tepid one, or rather imperceptible warmth, is the great promoter of them. In this neutral state, therefore, with proper contrivances to preserve and continue it, the liquor is to be put into a suitable vessel for fermentation ; at which time, if it works not of itself, it must be quickened by additions ; and, in general, by such things as are commonly called *ferments*.

The juices of plants are strangely altered by fermentation ; and are susceptible of many, and those very various, changes from it. And it is not only the juices of fruits that are thus to be wrought upon, as those of apples, pears, grapes, and the like, in the common way ; but there is an artificial change to be made in the seeds of plants by what is called *malting*. And it is not grain alone that is thus to be wrought upon, but any other seed whatever may be made to yield its juices and virtues freely to water by this process. The juices of roots also, for instance that of liquorice, will be wrought upon in the same manner ; and the juices of the bodies of trees, as of the birch, and the like. If in the month of March a hole be bored into the body of a birch-tree, and this hole be stopped with a cork, thro' the middle of which there is thrust a quill open at both ends, the juices of the tree will drop out at the quill at the rate of a large drop every second of a minute, and a great quantity will in time be obtained in this manner. This liquor is not unpleasant to the taste, and looks tolerably clear, resembling water into which a little milk had been spilt. There are many ways of fermenting this juice, by all of which it is converted into a sort

of wine. These are well known. But there is another remarkable property in our maples, both the common small kind and the great one, which we call the sycamore : these being tapped in the same manner, will bleed freely in winter ; and their juices, after a hard frost breaks, will flow out in so copious a manner as is scarce to be conceived. The willow, the poplar, and the walnut-tree, will all bleed also ; and fermentation, of which their several juices are easily susceptible, will turn them all into palatable and strong wines.

FERN, *FILIX*, in botany. See *FILICES*.

Fern is very common in dry and barren places. It is one of the worst weeds for lands, and very hard to destroy where it has any thing of a deep soil to root in. In some grounds, the roots of it are found to the depth of eight feet. One of the most effectual ways to destroy it is often mowing the grass ; and, if the field is ploughed up, plentiful dunging thereof is very good ; but the most certain remedy for it is urine. However, fern, cut while the sap is in it, and left to rot upon the ground, is a very great improver of land.

In some places in North-Britain, the inhabitants mow it green ; and, burning it to ashes, make those ashes up into balls with a little water. They then dry them in the sun, and make use of them to clean their linen with ; looking upon it to be near as good as soap for that purpose.

Male FERN. See *POLYPODIUM*.

Female FERN. See *PTERIS*.

FERNANDO, or FERNANDES, an island in the Pacific ocean. See *Juan Fernandes*.

FERNELIUS (John), physician to Henry II. king of France, was born in Picardy, in the latter end of the 15th, or the beginning of the 16th century. Being sent to Paris to study rhetoric and philosophy, he applied himself in a most intense manner. All other pleasure was insipid to him. He cared neither for play nor for walking, nor for entertainments, nor even for conversation. He read Cicero, Plato, and Aristotle. The reading of Cicero procured him this advantage, that the lectures he read on philosophical subjects were as eloquent as those of the other masters were barbarous at that time. He also applied himself very earnestly to the mathematics. This continual study drew upon him a long fit of sickness, which obliged him to leave Paris. On his recovery, he returned thither with a design to study physic ; but before he applied himself entirely to it, he taught philosophy in the college of St Barbara. After this he spent four years in the study of physic ; and taking a doctor's degree, confined himself to his closet, in order to read the best authors, and to improve himself in the mathematics ; that is, as far as the business of his profession would suffer him. Never was a man more diligent than Fernel. He used to rise at four o'clock in the morning, and studied till it was time either to read lectures or to visit patients. He then examined the urine that was brought him ; for this was the method of those times, with regard to the poor people, who did not send for the physician. Coming home to dine, he shut himself up among his books till they called him down to table. Rising from table, he returned to his study, which he did not leave without necessary occasions. Coming home at night, he did just as at noon : he staid among his books till they called him to supper ; re-

Fern
Fernelius.

Fernelius turned to them the moment he had supped; and did not leave them till eleven o'clock, when he went to bed. In the course of these studies, he contrived mathematical instruments, and was at great charges in making them. But his wife murmuring at the expence, he dismissed his instrument-makers, and applied himself in good earnest to practice physic. But as visiting patients did not employ his whole time, he read public lectures upon Hippocrates and Galen. This soon gained him a great reputation through France and in foreign countries. His business increasing, he left off reading lectures; but as nothing could make him cease to study in private, he spent all the hours he could spare in composing a work of physic, intitled *Physiologia*, which was soon after published. He was prevailed with to read lectures upon this new work, which he did for three years: and undertaking another work, which he published, *De venæ sectione*, he laid himself under a necessity of reading lectures some years longer, in order to explain this new book to the youth. While he was thus employed, he was sent for to court, in order to try whether he could cure a lady, whose recovery was despaired of. He was so happy as to cure her; which was the first cause of that esteem which Henry II. who was then but dauphin, and was in love with that lady, conceived for him. This prince offered him, even then, the place of first physician to him; but Fernel, who infinitely preferred his studies to the hurry of a court, would not accept the employment. When Henry came to the throne, he renewed his intreaties: but Fernel represented, that the honour which was offered to him was due, for several reasons, and as an hereditary right, to the late king's physician; and that, as for himself, he wanted some time to make experiments concerning several discoveries he had made relating to physic. The king admitted this: but as soon as Francis I.'s physician died, Fernel was obliged to go and fill his place at Henry II.'s court. And here just the contrary to what he dreaded came to pass; for he enjoyed more rest and more leisure at court than he had done at Paris; and he might have considered the court as an agreeable retirement, had it not been for the journeys which the new civil wars obliged the king to take. He died in 1558, leaving behind him a great many works, besides what have been mentioned; as *De abditis rerum causis*, seven books of Pathology, a book on Remedies, &c. They have been printed several times; with his life prefixed, written by William Plantius his disciple.

FERONIA, the pagan goddess of woods and orchards. This deity took her name from the town Feronia, situated at the foot of mount Soracte in Italy, where was a wood and temple consecrated to her. That town and wood are mentioned by Virgil, in the catalogue of Turnus's forces. Strabo relates, that those who sacrificed to this goddess, walked barefoot upon burning coals, without being hurt. She was the guardian deity of freed-men, who received their cap of liberty in her temple.

FERRARA, a city of Italy, in the territory of the pope, capital of a duchy of the same name. It is seated in an agreeable and fertile plain; watered by the river Po, which is a defence on one side; and on the other is encompassed by a strong wall and deep broad ditches full of water, as well as by a good citadel, finish-

ed by pope Paul. In the middle of the city is a magnificent castle, which was formerly the palace of the dukes, and is not now the least ornament of Ferrara. It is quite surrounded with water; and the arsenal which is near it, deserves the observation of travellers. Over-against the palace is the duke's garden; with a park called *Belvidere* on account of its beauty. Behind the garden there is a palace built with white marble, called the *palace of diamonds*, because all the stones are cut diamond fashion.

Ferrara had formerly a considerable trade; but it is now almost deserted, being very poor, inasmuch that there is hardly a person to be seen in the streets. This is owing to the exactions of the popes. The fortifications are now neglected, and the ancient university is dwindled into a wretched college of the Jesuits. However, in 1735, it was advanced to an archbishopric by pope Clement XII. The country about it is so marshy, that a shower or two of rain renders the roads almost impassable. It is 24 miles north-east of Bologna, 38 north-west of Ravenna, 70 north-by-west of Florence, and 190 north of Rome. E. long. 12. 14. N. Lat. 44. 36.

FERRARA, the duchy of; a province in the pope's territory, bounded on the north by the state of Venice, on the west by the duchies of Mantua and Mirandola, on the south by the Boulognese and by Romania, of which it was formerly a part, and on the east by the Gulph of Venice. It is 50 miles in length, and 43 in breadth along the coast; but grows narrower and narrower towards the Mantuan. This country is almost surrounded by the branches of the Po, which often overflow the country, and form the great morasses of Comachio, which has a bad effect on the air. It is thin of people, and indifferently cultivated, though fit for corn, pulse, and hemp. The Po and the lake of Comachio yield a large quantity of fish. Ferrara is the capital town; besides which, there are Arano, Comachio, Magnavacca, Belriguardo, Cento, Buendeno, and Ficherola. This duchy was formerly possessed by the house of Este. But the pope took possession of it in 1598, after the death of Alphonso II. duke of Ferrara, it being a fief of the church.

FERRARIA, in botany, : A genus of the triandria order, belonging to the gynandria class of plants; and in the natural method ranking under the sixth order, *Ensatæ*. The spathæ are uniflorous; the petals six in number, and wavyly curled; the stigmata cucullated or cowled; the capsule is trilocular, inferior. There are two species, natives of the Cape of Good Hope. There is a great singularity in the root of one of these species, that it vegetates only every other year, and sometimes every third year; in the intermediate time it remains inactive, though very sound and good.

FERRARS (George), a lawyer, poet, historian, and accomplished gentleman, was descended from an ancient family in Hertfordshire, and born about the year 1510, in a village near St Alban's. He was educated at Oxford, and thence removed to Lincoln's inn; where applying with uncommon diligence to the study of the law, he was soon distinguished for his elocution at the bar. Cromwell earl of Essex, the great minister of Henry VIII. introduced him to the king, who employed him as his menial servant, and, in 1535, gave him

Ferrara
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Ferrara.

Ferrars
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Ferretto.

him a grant of the manor of Flamstead in his native county. This is supposed to have been a profitable estate; nevertheless, Mr Ferrars being a gay courtier, and probably an expensive man, about seven years after was taken to execution by a sheriff's officer for a debt of 200 merks and lodged in the compter. Being at this time member for Plymouth, the house of commons immediately interfered, and he soon obtained his liberty. He continued in favour with the king to the end of his reign, and in that of Edward VI. he attended the lord protector Somerset as a commissioner of the army in his expedition to Scotland in 1548. In the same reign, the young king being then at Greenwich, Mr Ferrars was proclaimed *lord of misrule*, that is, prince of sports and pastimes; which office he discharged during 12 days, in Christmas holidays, to the entire satisfaction of the court. This is all we know of Mr Ferrars; except that he died in 1579, at Flamstead in Hertfordshire, and was buried in the parish-church. He is not less celebrated for his valour in the field, than for his other accomplishments as a gentleman and a scholar. He wrote, 1. *History of the Reign of Queen Mary*; published in Grafton's chronicle, 1569, fol. 2. Six tragedies, or dramatic poems; published in a book called the *Mirror for Magistrates*, first printed in 1559, afterwards in 1587, and again in 1610.

FERRARS (Henry), a Warwickshire gentleman of a good family, was eminent in antiquities, genealogies, and heraldry. Mr Wood says, that out of the collections of this gentleman, Sir William Dugdale laid part of the foundation of his celebrated *Antiquities of Warwickshire*. Camden also makes honourable mention of his assistance in relation to Coventry. Some scattered poems of his were published among others in the reign of queen Elizabeth; and he died in 1633.

FERRET, in zoology. See MUSTELA.

FERRETS, among glass-makers, the iron with which the workmen try the melted metal, to see if it be fit to work.—It is also used for those irons which make the rings at the mouth of the bottles.

FERRETTO, in glass-making, a substance which serves to colour glass.

This is made by a simple calcination of copper, but it serves for several colours; there are two ways of making it. The first is this. Take thin plates of copper, and lay them on a layer of powdered brimstone, in the bottom of a crucible; over these lay more brimstone, and over that another layer of the plates, and so on alternately till the pot is full. Cover the pot, lute it well, place it in a wind furnace; and make a strong fire about it for two hours. When it is taken out and cooled, the copper will be found so calcined, that it may be crumbled to pieces between the fingers like a friable earth. It will be of a reddish, and, in some parts, of a blackish colour. This must be powdered and sifted fine for use.

Another way of making ferretto is as follows. Make a number of stratifications of plates of copper and white vitriol alternately in a crucible; which place on the floor of the glass furnace near the eye; and let it stand there three days; then take it out, and make a new stratification with more fresh vitriol; calcine again as before. Repeat this operation six times, and a most valuable ferretto will be obtained.

FERRI (Ciro) a skilful painter, born of a good family at Rome, in 1634. He was bred under Peter Cortona; and the works of the scholar are often mistaken for those of the master. The great duke of Tuscany nominated him chief of the Florentine school; and he was as good an architect as a painter. He died in 1689.

Ferri,
Ferro.

FERRO, (W. Long. 19. N. Lat. 28), the most westerly of the Canary islands, near the African coast, where the first meridian was lately fixed in most maps; but now, the geographers of almost every kingdom make their respective capitals the first meridian, as the English do London. It is a dry and barren spot, affording no water except what is supplied in a very surprising manner by a tree which grows in these islands. See FOUNTAIN-Tree.

FERRO, *Faro*, or *Feroe Islands*; a cluster of little islands lying in the Northern ocean, between 61° and 63° N. Lat. and between 5° and 8° W. Long. They belong to Denmark. There are 17 which are habitable; each of which is a lofty mountain arising out of the waves, divided from the others by deep and rapid currents. Some of them are deeply indented with secure harbours; Providence seeming to have favoured mankind with the safest retreats in the most boisterous seas. All are very steep, and most of them faced with most tremendous precipices. The surface of the mountains consists of a shallow soil of remarkable fertility; for barley, the only corn sown here, yields above 20 for one; and the grass affords abundant pasturage for sheep. The exports are, salted mutton and tallow, goose-quills, feathers, and eider down; and, by the industry of the inhabitants, knit woollen waistcoats, caps, and stockings. No trees beyond the size of juniper or stunted willows will grow here: nor are any wild quadrupeds to be met with except rats and mice, originally escaped from the shipping. Vast quantities of sea-fowl frequent the rocks; and the taking of them furnishes a very perilous employment to the natives, as described under the article *BIRD-Catching*.

The sea which surrounds these islands is extremely turbulent. The tides vary greatly on the western and eastern sides. On the first, where is received the uninterrupted flood of the ocean from the remote Greenland, the tide rises seven fathoms; on the eastern side it rises only three. Dreadful whirlwinds, called by the Danes *oes*, agitate the sea to a strange degree; catch up a vast quantity of water, so as to leave a great temporary chasm in the spot on which it falls, and carries away with it, to an amazing distance, any fishes which may happen to be within reach of its fury. Thus great shoals of herrings have been found on the highest mountains of Ferroe. It is equally restless on land; tearing up trees, stones, and animals, and carrying them to very distant places.

Among the numerous whirlpools of these seas, that of Suderoe, near the island of the same name, is the most noted. It is occasioned by a crater 61 fathoms in depth in the centre, and from 50 to 55 on the sides. The water forms four fierce circumgyrations. The point they begin at is on the side of a large basin, where commences a range of rocks running spirally, and terminating at the verge of the crater. This range is extremely rugged, and covered with water from the depth of 12 to 8 fathoms only. It forms four equidistant

Ferrol
1
Ferula

distant wreaths, with a channel from 35 to 20 fathoms in depth between each. On the outside, beyond that depth, the sea suddenly sinks to 80 and 90. On the south border of the basin is a lofty rock, called *Sumbor Munk*, noted for the multitude of birds which frequent it. On one side, the water is only 3 or 4 fathoms deep; on the other 15. The danger at most times, especially in storms, is very great. Ships are irresistibly drawn in; the rudder loses its power; and the waves beat as high as the masts; so that an escape is almost miraculous: yet at the reflux, and in very still weather, the inhabitants will venture in boats for the sake of fishing.

FERROL, a sea-port town of Spain, in the province of Galicia, seated on a bay of the Atlantic ocean. It has a good harbour, and is frequented by the Spanish fleet in time of war. W. Long. 8. 46. N. Lat. 43. 26.

FERRUGINOUS, any thing partaking of iron, or which contains particles of that metal.

FERRUGO, *RUST*. See *RUST*.

FERRUM, *IRON*. See *IRON*.

FERRY, a convenient place for a passage-boat, on a frith or river for carrying passengers, horses, &c. over the same for a reasonable toll.

FERTILITY, that quality which denominates a thing fruitful or prolific.

Nothing can produce fertility in either sex, but what promotes perfect health: nothing but good blood, spirits, and perfect animal functions, that is, high health, can beget perfect fecundity; and therefore, all means and medicines; all nostrums and specifics, to procure fertility, different from those which procure good blood and spirits, are arrant quackery. Dr Cheyne says, that water-drinking males are very rarely infertile; and that if any thing in nature can prevent infertility, and bring fine children, it is a milk and seed diet persevered in by both parents.

To increase the fertility of *vegetables*, says lord Bacon, we must not only increase the vigour of the earth and of the plant, but also preserve what would otherwise be lost: whence he infers, that there is much saved by setting, in comparison of sowing. It is reported, continues he, that if nitre be mixed with water to the thickness of honey, and after a vine is cut, the bud be anointed therewith, it will sprout within eight days. If the experiment be true, the cause may be in the opening of the bud, and contiguous parts, by the spirit of the nitre; for nitre is the life of vegetables.

How far this may be true, is not perhaps sufficiently shown, notwithstanding the experiments of Sir Kenelm Digby and M. Homberg. Consult Mr Evelyn's *Sylva*, the *Philosophical Transactions*, the *French Memoirs*, and Dr Stahl's *Philosophical Principles of Chemistry*; but a proper set of accurate experiments seems still wanting in this view.

FERULA, a little wooden pallet or slice, reputed the schoolmaster's sceptre, wherewith he chastises the boys, by striking them on the palm of the hand. The word is Latin, and has also been used to denote the prelate's crozier and staff. It is supposed to be formed of the Latin, *ferire*, "to strike." Under the eastern empire, the ferula was the emperor's sceptre, as is seen

on divers medals; it consists of a long stem or shank, and a flat square head. The use of the ferula is very ancient among the Greeks, who used to call their princes *ταφευροσφοροι*, q. d. "ferula-bearers."

In the ancient eastern church, ferula or *narthex* signified a place separated from the church; wherein the penitents or the catechumens of the second order, called *auscultantes*, *απομαρτυροι*, were kept, as not being allowed to enter the church; whence the name of the place, the persons therein being under penance or discipline: *sub ferula erant ecclesiae*.

FERULA, *Fennel-giant*, in botany: A genus of the digynia order, belonging to the pentandria class of plants: and in the natural method ranking under the 45th order *Umbellata*. The fruit is oval, compressed plane, with three striæ on each side. There are nine species; all of them herbaceous perennials, rising from three to ten or twelve feet high, with yellow flowers. They are propagated by seeds, which should be sown in autumn; and, when planted out, ought to be four or five feet distant from each other, or from any other plants; for no other will thrive under their shade. The drug *assafetida* is obtained from a species of ferula; though not peculiarly, being also produced by some other plants.

FESCENNIA, or **FESCENNIUM**, (anc. geog.) a town of Etruria, above Falerii; where the Fescennine verses were first invented. Now *Galese*, in the Ecclesiastical State, near the Tiber.

FESCENNINE VERSES, in antiquity, were a kind of satirical verses, full of wanton and obscene expressions, sung or rehearsed by the company, with many indecent gestures and dances, at the solemnization of a marriage among the Romans; (*Hor. ep. i. lib. v. 145.*) The word is borrowed, according to Macrobius, from *fascinum*, "a charm;" the people taking such songs to be proper to drive away witches, or prevent their effect; but its more probable origin is from Fescennium, a city of Campania, where such verses were first used.

FESSE, in heraldry, one of the nine honourable ordinaries. See *HERALDRY*.

FESSE-POINT, is the exact centre of the escutcheon. See *POINT*.

FESSE-WAYS, or *in FESSE*, denotes any thing borne after the manner of a fesse; that is, in a rank across the middle of the shield.

Party per FESSE, implies a parting across the middle of the shield, from side to side, through the fesse point.

FESTI DIES, in Roman antiquity, certain days in the year, devoted to the honour of the gods.

Numa, when he distributed the year into 12 months, divided the same into the *dies festi*, *dies profesti*, and *dies intercesi*.

The festi were again divided into days of sacrifices, banquets, games, and *seriæ*. See *FERIÆ*.

The *profesti* were those days allowed to men for the administration of their affairs, whether of a public or private nature: these were divided into *fasti*, *comitiales*, &c. See *FASTI*, *COMITIALES*, &c.

The *intercesi* were days common both to gods and men, some parts of which were allotted to the service of the one, and some to that of the other.

FESTINO, in logic, the third mood of the second figure of the syllogism, the first proposition whereof is

Ferula
1
Festino

Festival
Fetus.

an universal negative, the second a particular affirmative, and the third a particular negative; as in the following example:

FES No bad man can be happy.

TI Some rich men are bad men.

NO Ergo, some rich men are not happy.

FESTIVAL, a time of feasting: See FEAST.—The term is particularly applied to anniversary days of civil or religious joy.

FESTOON, in architecture and sculpture, &c. an ornament in form of a garland of flowers, fruits, and leaves, intermixed or twisted together.

It is in the form of a string or collar, somewhat biggest in the middle, where it falls down in an arch; being extended by the two ends, the extremities of which hang down perpendicularly.

Festoons are now chiefly used in friezes, and other vacant places which want to be filled up and adorned; being done in imitation of the long clusters of flowers, which the ancients placed on the doors of their temples and houses on festival occasions.

FESTUCA, FESCUE, in botany: A genus of the digynia order, belonging to the triandria class of plants; and in the natural method ranking under the 34th order, Gramina. The calyx is bivalved; and the spicula or partial spike is oblong and a little roundish, with the glumes acuminate. There 16 species; two of which, as being the most remarkably useful, are described under the article AGRICULTURE, n° 53—58. Another species, called the *fluitans*, or *floating fescue*, from its growing in wet ditches and ponds, is remarkable for the uses that are made of its seeds. These seeds are small, but very sweet and nourishing. They are collected in several parts of Germany and Poland, under the name of *mana seeds*; and are used at the tables of the great, in soups and gruels, on account of their nutritious quality and grateful flavour. When ground to meal, they make bread very little inferior to that in common use. The bran, separated in preparing the meal, is given to horses that have worms; but they must be kept from water for some hours afterwards. Geese are also very fond of these seeds.—Mr Lightfoot recommends this as a proper grass to be sown in wet meadows.

FESTUS (Pompeius), a celebrated grammarian of antiquity, who abridged a work of Verrius Flaccus, *De Significatione Verborum*; but took such liberties in castration and criticising, as, Gerard Vossius observes, are not favourable to the reputation of his author. A complete edition of his fragments was published by M. Docier in 1681, for the use of the Dauphin. Scaliger says, that Festus is an author of great use to those who would attain the Latin tongue with accuracy.

FETLOCK, in the manege, a tuft of hair growing behind the pastern joint of many horses; for those of a low size have scarce any such tuft.

FETTI (Domenico), an eminent painter in the style of Julio Romano, was born at Rome in 1589, and educated under Ludovico Civali of Florence. He painted but little for churches, but excelled in history; his pictures are much sought after, and are scarce. He abandoned himself to disorderly courses; and put an end to his life, by excesses, in the 35th year of his age.

FETUS. See FOETUS.

FEUD, in ancient customs, is used for a capital quarrel or enmity, not to be satisfied but with the death of the enemy; and thence usually called *deadly feud*.—*Feud*, called also *feida*, and *feida*, in the original German signifies *guerram*, i. e. *bellum*, "war." Lambert writes it *feeth*, and saith it signifies *capitales inimicitias*, or "implacable hatred."

In Scotland, and the north of England, feud is particularly used for a combination of kindred, to revenge the death of any of their blood, against the killer and all his race, or any other great enemy.

FEUD (*Feoda*), the same with *Fief*, or *Fee*. See FEODAL System.

FEUDAL, or FEODAL, of or belonging to a feud or fee. See FEODAL.

FEUDATORY, or FEODATORY, a tenant who formerly held his estate by feodal service. See FEODAL TENURE.

FEU-DUTY, in Scots law, is the annual rent or duty which a vassal, by the tenor of his right, becomes bound to pay to his superior.

FEU-Holding, in Scots law, is that particular tenure by which a vassal is taken bound to pay an annual rent or feu-duty to his superior.

FEVER. See (*Index* subjoined to) MEDICINE.

The ancients deified the diseases as well as the passions and affections of men. Virgil places them in the entrance into hell, *Æn.* vi. 273. Among these, *Fever* had a temple on mount Palatine and two other parts of ancient Rome; and there is still extant an inscription to this goddess. FEBRI. DIVÆ. FEBRI. SANCTÆ. FEBRI. MAGNÆ, CAMBLA. AMATA. PRO. FILIO. MALE. AFFECTO.

FEVER, in farriery. See there, sect. viii.

FEVERFEW, in botany. See MATRICARIA.

FEVERSHAM, a town of the county of Kent in England, situated on a branch of the river Thames, which is navigable for hoys. It was a royal demesne A. D. 811, and called in Kenulf's charter the *King's little Town*, though it is now a large one. It was inhabited by the Britons long before the invasion of Cæsar. In 903, king Athelstan held a great council here. King Stephen erected a stately abbey, 1147, whose abbots sat in parliament; and he was buried in it, together with Maud his queen, and Eustace his son; but of this building two mean gate-houses are all that now remain. The town was first incorporated by the name of the Barons of Feversham, afterwards by Henry VIII. with the title of the mayor and commonalty, and lastly by that of the mayor and jurats and commonalty. It is a populous flourishing place, consisting chiefly of two long broad streets, with a market-house in the centre, built 1574. Its ancient church was rebuilt in 1754, at the expence of 2300 l. but was originally built in Edwards II.'s reign. There is a free grammar-school in the place, built and endowed by Queen Elizabeth in 1582; also two charity-schools. It is a member of the cinque port of Dover, and has a manufactory of gunpowder. The London markets are supplied from hence with abundance of apples and cherries, and the best oysters for stewing. These last are also fetched away in such quantities by the Dutch that a prodigious number of men and boats are employed here in the winter to drudge for them; and

Feud
Feversham.

Fevillea
1
Fez.

and it is said they carry home as many as amount to above 2000 l. a-year. The fishermen will admit none to take up their freedom but married men.

FEVILLEA, in botany: A genus of the pentandria order, belonging to the dioecia class of plants; and in the natural method ranking under the 34th order, *Cucurbitacea*. The male calyx is quinquefid; the corolla the same; there are five stamina; and the nectarium consists of five filaments connivent or closing together. The female calyx is quinquefid; the styles are three; and the fruit is an hard trilocular apple with an hard bark.

FEVRE (Toneguile), of Caen in Normandy, born 1615, was an excellent scholar in the Greek and Roman learning. Cardinal de Richelieu gave him a pension of 2000 livres to inspect all the works published at the Louvre, and designed to have made him principal of a college he was about to erect at Richelieu. But the cardinal's death cut off his hopes; and Cardinal Mazarine having no great relish for learning, his pension was ill-paid. Some time after, the Marquis de Franciere, governor of Langres, took him along with him to his government, and there he embraced the Protestant religion; after which he was invited to Saumur, where he was chosen Greek professor. He there taught with extraordinary reputation. Young men were sent to him from all the provinces in the kingdom, and even from foreign countries, while divines and professors themselves gloried in attending his lectures. He was preparing to go to Heidelberg, whither he was invited by the prince Palatine, when he died, aged 57. He wrote, 1. Notes on Anacreon, Lucretius, Longinus, Phædrus, Justin, Terence, Virgil, Horace, &c. 2. A short account of the lives of the Greek poets. 3. Two volumes of letters; and many other works.

FEVRE (Claude), an eminent French painter, was born at Fontainebleau in 1633, and studied in the palace there, and then at Paris under Le Sueur and Le Brun; the latter of whom advised him to adhere to portraits, for which he had a particular talent, and in his style equalled the best masters of that country. He died in England in 1675, aged 42.

FEZ, the capital of a kingdom of the same name in Barbary, in Africa. It is described as a very large place, surrounded with high walls, within which there are hills and valleys, only the middle being level and flat. The river, which runs through the city, is divided into two streams, from which canals are cut into every part of the town; so that the mosques, colleges, palaces, and the houses of great men, are amply supplied with water. They have generally square marble basins in the middle of the court of their houses, which are supplied with water by marble pipes that pass through the walls. They constantly run over, and the stream returns back into the street, and so into the river. The houses are built with brick or stone; and are adorned on the outside with fine Mosaic work, or tiles like those of Holland. The wood-work and ceilings are carved, painted, and gilt. The roofs are flat; for they sleep on the tops of the houses in summer. Most of the houses are two stories high, and some three. There are piazzas and galleries running all round the court on the inside, so that you may go under cover from one apartment to another. The pillars are of brick, covered

with glazed tiles, or of marble, with arches between. The timber-work is carved and painted with gay colours, and most of the rooms have marble cisterns of water. Some of the great men build towers over their houses several stories high, and spare no expence to render them beautiful; from hence they have a fine prospect all over the city.

There are in this city 700 mosques, great and small; 50 of which are magnificent, and supported with marble pillars, and other ornaments. The floors are covered with mats, as well as the walls to the height of a man. Every mosque has a tower or minaret, like those in Turkey, with a gallery on the top, from whence they call the people to prayers. The principal mosque is near a mile and a half in circumference. The middle building is 150 yards in length, and 80 in breadth, with a tower proportionably high. Round this to the east, west, and north, there are great colonades 30 or 40 yards long. There are 900 lamps lighted every night; and in the middle of the mosque are large branches which are capable of holding 500 lamps each. Along the walls are seven pulpits, from which the doctors of the law teach the people. The business of the priest is only to read prayers, and distribute alms to the people; to support which, there are large revenues.

Besides the mosques, there are two colleges built in the Moorish manner, and adorned with marble and paintings. In one of them there are 100 rooms, besides a magnificent hall. In this there is a great marble vase full of water, adorned with marble pillars of various colours, and finely polished. The capitals are gilt, and the roof shines with gold, azure, and purple. The walls are adorned with Arabic verses in gold characters. The other colleges are not near so beautiful, or rather all are gone to ruin since the neglect of learning.

There are hospitals in the city, where formerly all strangers were maintained three days *gratis*. But the estates belonging to them have been confiscated for the emperor's use. There are above 100 public baths, many of which are stately buildings. People of the same trade or business live in streets by themselves.

Though the country about Fez is pleasant and fertile, and in many places abounding with corn and cattle, yet a great part of it lies waste and uncultivated, not so much for want of inhabitants as from the oppression of the governors; which makes the people choose to live at some distance from the high roads, where they cultivate just as much land as is necessary for their own subsistence.

Round the city there are fine marble tombs, monuments, and gardens full of all manner of fruit-trees.

Such are the common accounts of this city. The following are given by M. Chenier in his *Recherches Historiques sur les Maures*.

Fez was built in the end of the eighth century by Edris, a descendant of Mahomet and of Ali; whose father, in order to avoid the prescriptions of the calif Abdallah, retired to the extremity of Africa, and was proclaimed sovereign by the Moors. Sidy Edris, having succeeded to the throne of his father, built the city of Fez in the year 793. He caused a mosque to be erected, in which his body was interred, and the city ever afterwards became an asylum for the Moors, and a place of devotion. In the first moments of ser-

Fez.

Fes.

your which a new worship inspires, another mosque was built called *Carubin*, which is perhaps one of the largest and most beautiful edifices in Africa. Several others were successively built, besides colleges and hospitals; and the city was held in such veneration, that when the pilgrimage to Mecca was interrupted in the fourth century of the Hegira, the western Mahometans substituted that of Fez in its stead, while the eastern people went to Jerusalem.

When the Arabs had overspread Asia, Africa, and Europe, they brought to Fez the little knowledge they had acquired in the sciences and arts; and that capital conjoined, with the schools of religion, academies where philosophy was taught, together with medicine and astronomy. This last gradually degenerated; ignorance brought astrology into repute, and this quickly engendered the arts of magic and divination.

Fez soon became the common resort of all Africa. The Mahometans went thither for the purposes of devotion; the affluence of strangers introduced a taste for pleasure; libertinism quickly followed; and, as its progress is most rapid in warm countries, Fez, which had been the nurse of sciences and arts, became a harbour for every kind of vice. The public baths, which health, cleanliness, and custom, had rendered necessary, and which were every where respected as sacred places, became scenes of debauchery; where men introduced themselves in the habit of women: youths, in the same disguise, with a distaff in their hands, walked the streets at sunset in order to entice strangers to their inns, which were less a place of repose than a convenience for prostitution.

The usurpers who disputed the kingdom of Fez after the 16th century overlooked these abuses, and contented themselves with subjecting the masters of the inns to furnish a certain number of cooks for the army. It is to this laxity of discipline that Fez owed its first splendour. As the inhabitants are beautiful, the Africans flocked thither in crowds; the laws were overturned, morals despised, and vice itself turned into an engine of political resource. The same spirit, the same inclinations, the same depravity, still exist in the hearts of all the Moors. But libertinism is not now encouraged: it wears there, as in other places, the mask of hypocrisy; and dares not venture to show itself in the face of day.

The Mahometans of Andalusia, those of Granada and Cordova, migrated to Fez during the different revolutions that agitated Spain: they carried with them new customs and new arts, and perhaps some slight degree of civilization. The Spanish Moors carried from Cordova to Fez the art of staining goat and sheep skins with a red colour, which were then called Cordova leather, and now Morocco leather, from that city where the art is less perfect. They manufacture gauzes at Fez, silk stuffs, and girdles elegantly embroidered with gold and silk, which show how far their ingenuity might be carried if industry were more encouraged.

There is still some taste for study preserved at Fez, and the Arabic language is spoken there in greater purity than in any other part of the empire. The rich Moors send their children to the schools at Fez, where they are better instructed than they could be elsewhere.

Leo Africanus, in the 16th century, gave a magnificent description of this city, from which most of those

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that have been afterwards made are copied; but its situation, its schools, and the industry and great urbanity of its inhabitants, are the only circumstances that give it any preference to the other cities of the empire. There are some pretty convenient inns here, consisting of two or three stories. The houses have no elegance externally: the streets are ill paved, and so strait that two persons riding abreast can hardly pass. The shops are like stalls; and have no more room in them than is sufficient to serve for the owner, who is always seated with his wares around him, which he shows to the passengers. But though the Moors of Fez are more civilized than the rest, they are vain, superstitious, and intolerant; and an order must be obtained from the emperor before a Christian or a Jew can be allowed to enter the city.

The situation of Fez is exceedingly singular. It lies in the bottom of a valley surrounded by little hills in the shape of a funnel; the declivities are divided into gardens planted with tall trees, orange shrubs, and all sorts of fruit-trees; a river meanders along the declivity, and turns a number of mills, which disperse the water abundantly to all the gardens, and almost to every house. The descent to the city, which stands in the centre, is long; and the road lies through these gardens, which it traverses in a serpentine direction.

The gardens seen from the city, form a most delightful amphitheatre. Formerly each garden had a house in which the inhabitants spent the summer. These houses were destroyed in the times of the civil wars, and in the revolutions to which Fez has been subject, and few individuals have restored them. The situation of Fez, however, cannot be healthful; moist vapours fill the air in summer, and fevers are exceedingly common.

On the height above Fez, in a plain susceptible of rich cultivation, stands New Fez, finely situated, and enjoying excellent air, containing some old palaces, in which the children of the emperor live, and where he sometimes resides himself. New Fez is inhabited by some Moorish families, but by a greater number of Jews.

Fez is seated on the river Cebu, W. Long. 4. 25. N. Lat. 33. 58.

FEWEL. See FUEL.

FIASCONI, a town of Italy in the territories of the pope, remarkable for its good wine. E. Long. 13. 12. N. Lat. 42. 20.

FIAT, in law, a short order or warrant signed by a judge, for making out and allowing certain processes.

FIBRARIÆ, a class of fossils, naturally and essentially simple, not inflammable nor soluble in water; and composed of parallel fibres, some shorter, others longer; their external appearance being bright, and in some degree transparent: add to this, that they never give fire with steel, nor ferment with or are soluble in acid menstrua.

FIBRE, in anatomy, a perfectly simple body, or at least as simple as any thing in the human structure; being fine and slender like a thread, and serving to form other parts. Hence some fibres are hard, as the bony ones; and others soft, as those destined for the formation of all the other parts.

These fibres are divided also, according to their situation into such as are straight, oblique, transverse, annular,

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Fibre nular, and spiral; being found arranged in all these directions in different parts of the body.

Ficoides. **FIBRE** is also used to denote the slender **FILAMENTS** which compose other bodies, whether animal, vegetable, or mineral; but more especially the capillary roots of plants.

FIBROSE, or **FIBROUS**, something consisting of fibres, as the roots of plants. See **ROOT**.

FIBULA, in anatomy, the outer and slenderer of the two bones of the leg. See **ANATOMY**, n° 62.

FIBULA, in surgery, an instrument in use among the ancients for the closing of gaping wounds.—Celsus speaks of the fibula as to be used when the wound was so patent as not easily to admit of being sewed. (*Op. lib. viii. cap. 25. apud. fin.*)

FIBULA, in antiquity, was a sort of button, buckle, or clasp, made use of by the Greeks and Romans for keeping close or tying up some part of their cloaths. They are of various forms, and often adorned with precious stones. Men and women wore them in their hair and at their shoes. Players and musicians, by way of preserving the voices of children put under their care to learn their arts, used to keep close the prepuce with a fibula, lest they should have commerce with women.

FICINUS (Marfilius), a celebrated Italian, was born at Florence in 1433, and educated at the expence of Laurence de Medicis. He attained a perfect knowledge of the Greek and Latin tongues, and became a great philosopher, a great physician, and a great divine. He was in the highest favour with Laurence and Cosmo de Medicis, who made him a canon of the cathedral church of Florence. He applied himself intensely to the study of philosophy: and while others were striving who should be the deepest read in Aristotle, who was then the philosopher in fashion, he devoted himself wholly to Plato. He was indeed the first who restored the Platonic philosophy in the west; for the better effecting of which, he translated into Latin the whole works of Plato. There goes a story, but we know not how true it is, that when he had finished his translation, he communicated it to his friend Marcus Musurus, to have his approbation of it; but that, Musurus disliking it, he did it all over again. He next translated Plotinus; and afterwards the works, or part of them at least, of Proclus, Jamblicus, Porphyrius, and other celebrated Platonists.—In his younger years, Ficinus lived like a philosopher; and too much so, as is said, to the neglect of piety. However, Savonarola coming to Florence, Ficinus went with every body else to hear his sermons; and while he attended them for the sake of the preacher's eloquence, he imbibed a strong sense of religion, and devoted himself henceforward more especially to the duties of it. He died at Correggio in 1499; and as Baronius assures us upon the testimony of what he calls credible authors, appeared immediately after his death to his friend Michael Mercatus: to whom, it seems, he had promised to appear, in order to confirm what he had taught concerning the immortality of the soul. His writings, sacred and profane, which are very numerous, were collected and printed at Venice in 1516, at Basil in 1561 and 1576, and at Paris 1641, in two vols folio. Twelve books of his Epistles, among which are many treatises, were printed separately in folio at Venice 1495, and at Nuremberg 1497, in 4to.

FICOIDES, a name given to several distinct plants,

as the mesembryanthemum, musa, and opuntia. See **Fiction**, **Ficus**, **MESEMBRYANTHEMUM**, &c.

FICTION. See **FABLE** and **POETRY**.

FICUS, the **FIG-TREE**: A genus of the tricecia order, belonging to the polygamia class of plants; and in the natural method ranking under the 53d order, *Scabridæ*. The receptacle is common, turbinate, carnosous, and connivent; inclosing the florets either in the same or in a distinct one. The male calyx is tripartite; no corolla; three stamina: The female calyx is quinquepartite; no corolla; one pistil; and one seed.—There are ten species, of which the following are the most remarkable.

1. The Carica, or common Fig, with an upright stem branching 15 or 20 feet high, and garnished with large palmated or hand-shaped leaves. Of this there are a number of varieties; as the common fig, a large, oblong, dark purplish blue fruit, which ripens in August either on standards or walls, and the tree carries a great quantity of fruit.—The brown or chestnut fig; a large, globular, chestnut-coloured fruit, having a purplish delicious pulp, ripening in July and August.—The black Ischia fig; a middle-sized, shortish, flat-crowned, blackish fruit, having a bright pulp; ripening in the middle of August.—The green Ischia fig: a large, oblong, globular headed, greenish fruit, slightly stained by the pulp to a reddish-brown colour; ripens in the end of August.—The brown Ischia fig; a small, pyramidal, brownish-yellow fruit, having a purplish very rich pulp; ripening in August and September.—The Malta fig; a small flat-topped brown fruit, ripening in the middle of August or beginning of September.—The round brown Naples fig; a globular, middle-sized, light-brown fruit, and brownish pulp; ripe in the end of August.—The long, brown, Naples fig; a long dark-brown fruit, having a reddish pulp; ripe in September.—The great blue fig; a large blue fruit, having a fine red pulp.—The black Genoa fig; a large, pear-shaped, black-coloured fruit, with a bright red pulp; ripe in August.

2. The Sycamorus, or Sycamore of scripture. According to Mr Hasselquist, this is a huge tree, the stem being often 50 feet round. The fruit is pierced in a remarkable manner by an insect. There is an opening made in the calyx near the time the fruit ripens, which is occasioned in two different ways. 1. When the squamæ, which cover the calyx, wither and are bent back; which, however, is more common to the carica than the sycamore. 2. A little below the scales, on the side of the flower-cup, there appears a spot before the fruit is ripe; the fruit in this place is affected with a gangrene which extends on every side, and frequently occupies a finger's-breadth. It withers; the place affected becomes black: the fleshy substance in the middle of the calyx, for the breadth of a quill, is corroded; and the male blossoms, which are nearest to the bare side, appear naked, opening a way for the insect, which makes several furrows in the inside of the fruit, but never touches the stigmata, though it frequently eats the germen. The wounded or gangrenous part is at first covered or shut up by the blossoms; but the hole is by degrees opened and enlarged of various sizes in the different fruits; the margin and sides being always gangrenous, black, hard, and turned inwardly. The same gangrenous appearance is also found

Ficus.

found near the squamæ, after the insect has made a hole in that place. The tree is very common in the plains and fields of Lower Egypt. It buds in the latter end of March, and the fruit ripens in the beginning of June. It is wounded or cut by the inhabitants at the time it buds; for without this precaution, they say it would not bear fruit.

3. The Religiosa, or Banian-tree, is a native of several parts of the East-Indies. It hath a woody stem, branching to a great height and vast extent, with heart-shaped entire leaves ending in acute points. Of this tree the following lines of Milton contain a description equally beautiful and just:

—There soon they chose
The fig-tree; not that tree for fruit renown'd,
But such as, at this day to Indians known
In Malabar or Decan, spreads her arms,
Branching so broad and long, that in the ground
The bended twigs take root, and daughters grow
About the mother tree, a pillar'd shade,
High over arch'd, and echoing walks between:
There oft the Indian herdsman, shunning heat,
Shelters in cool, and tends his pasturing herds
At loop-holes cut through thickest shade.

PAR. LOST, Book ix. l. 1100.

The Banian-tree, or Indian fig, is perhaps the most beautiful of Nature's productions in that genial climate, where she sports with the greatest profusion and variety. Some of these trees are of amazing size and great extent, as they are continually increasing, and, contrary to most other things in animal and vegetable life, they seem to be exempted from decay. Every branch from the main body throws out its own roots; at first in small tender fibres, several yards from the ground: these continually grow thicker until they reach the surface; and there striking in, they increase to large trunks, and become parent-trees, shooting out new branches from the top: these in time suspend their roots, which, swelling into trunks produce other branches; thus continuing in a state of progression as long as the earth, the first parent of them all contributes her sustenance. The Hindoos are peculiarly fond of the Banian-tree; they look upon it as an emblem of the Deity, from its long duration, its out-stretching arms, and overshadowing beneficence; they almost pay it divine honours, and,

"Find a fane in every sacred grove."

Near these trees the most esteemed pagodas are generally erected; under their shade the Bramins spend their lives in religious solitude; and the natives of all castes and tribes are fond of recreating in the cool recesses, beautiful walks, and lovely vistas of this umbrageous canopy, impervious to the hottest beams of a tropical sun.

A remarkable large tree of this kind grows on an island in the river Nerbedda, ten miles from the city of Baroche in the province of Guzerat, a flourishing settlement, lately in the possession of the English East India company, but ceded by the government of Bengal, at the treaty of peace concluded with the Mahrattas in 1783, to Mahdajee Scindia a Mahratta chief. It is distinguished by the name of Cubber Burr, which was given it in honour of a famous saint. It was once much larger than at present: but high floods have carried away the banks of the island where it grows, and with them such parts of the tree as had thus far extended their roots: yet what remains is about 2000 feet in circumference, measured round the principal stems; the

Ficus.

over-hanging branches, not yet struck down, cover a much larger space. The chief trunks of this single tree (which in size greatly exceed the English elms and oaks), amount to 350; the smaller stems, forming into stronger supporters, are more than 3000; and every one of these is casting out new branches, and hanging roots in time to form trunks, and become the parents of a future progeny. Cubbeer Burr is famed throughout Indostan for its great extent and surpassing beauty: the Indian armies generally encamp around it; and at stated seasons, solemn jatarras, or Hindoo festivals, are held there, to which thousands of votaries repair from various parts of the Mogul empire. It is said that 7000 persons find ample room to repose under its shade. The English gentlemen, on their hunting and shooting parties, used to form extensive encampments, and spend weeks together under this delightful pavilion, which is generally filled with green wood-pigeons, doves, peacocks, and a variety of feathered songsters; crowded with families of monkies performing their antic tricks; and shaded by bats of a large size, many of them measuring upwards of six feet from the extremity of one wing to the other. This tree not only affords shelter, but sustenance, to all its inhabitants, being covered amid its bright foliage with small figs of a rich scarlet, on which they all regale with as much delight, as the lords of creation on their more costly fare in their parties.

Culture. The carica is the species of ficus most frequently cultivated in Britain, and the only one which does not require to be in a stove. It may be propagated either by suckers arising from the roots by layers, or by cuttings. The suckers are to be taken off as low down as possible; trim off any ragged part at bottom, leaving the tops entire, especially if for standards; and plant them in nursery-lines at two or three feet distance from each other, or they may at once be planted where they are to remain; observing, that if they are designed for walls, or espaliers, they may be headed to six or eight inches in March, the more effectually to force out lateral shoots near the bottom; but, if intended for standards, they must not be topped, but trained with a stem, not less than 15 or 18 inches for dwarf-standards, a yard for half-standards, and four, five, or six feet for full standards. Then they must be suffered to branch out to form a head; observing, that, whether against walls, espaliers, or standards, the branches or shoots must never be shortened unless to procure a necessary supply of wood: for the fruit is always produced on the upper parts of the young shoots; and if these are cut off, no fruit can be expected.—The best season for propagating these trees by layers is in autumn; but it may be also done any time from October to March or April. Choose the young pliable lower shoots from the fruitful branches: lay them in the usual way, covering the body of the layers three or four inches deep in the ground, keeping the top entire and as upright as possible; and they will be rooted and fit to separate from the parent in autumn; when they may be planted either in the nursery, or where they are to remain, managing them as above directed.

The time for propagating by cuttings is either in autumn at the fall of the leaf, or any time in March: choose well-ripened shoots of the preceding summer; short and of robust growth, from about 12 to 15 inches long; having an inch or two of the two years wood at their base, the tops left entire; and plant

F f 2

them

Ficus,
Fidd.

them six or eight inches deep, in a bed or border of good earth, in rows two feet asunder: and when planted in autumn, it will be eligible to protect their tops in time of hard frost, the first winter, with any kind of long loose litter.

That part of the history of the fig-tree, which for many ages was so enigmatical, namely, the *caprificalion*, as it is called, is particularly worthy of attention, not only as a singular phenomenon in itself, but as it has furnished one of the most convincing proofs of the reality of the sexes of plants. In brief it is this: The flowers of the fig-tree are situated within a pulpy receptacle, which we call fig or fruit: of these receptacles in the wild fig-tree, some have male flowers only, and others have male and female, both distinct, though placed in the same receptacle. In the cultivated fig, these are found to contain only female flowers; which are fecundated by means of a kind of gnatbred in the fruit of the wild fig-trees, which pierces that of the cultivated, in order to deposit its eggs within; at the same time diffusing within the receptacle the farina of the male flowers. Without this operation the fruit may ripen, but no effective seeds are produced: hence the garden fig can only be propagated by layers and cuttings in those countries where the wild fig is not known. The process of thus ripening the fruit, in the oriental countries, is not left to nature, but it is managed with great art, and different degrees of dexterity, so as to reward the skilful husbandman with a much larger increase of fruit than would otherwise be produced. A tree of the same size, which, in Provence, where caprificalion is not practised, may produce about 25 pounds of fruit, will, by that art in the Grecian islands bring ten times that quantity. See the article *CAPRIFICATION*.

Uses. Figs are a considerable article in the materia medica, chiefly employed in emollient cataplasms and pectoral decoctions. The best are those which come from Turkey. Many are also brought from the south of France, where they prepare them in the following manner. The fruit is first dipped in scalding hot lye made of the ashes of the fig tree, and then dried in the sun. Hence these figs stick to the hands, and scour them like lixivial salts; and for the same reason they excite to stool, without griping. They are moderately nutritive, grateful to the stomach, and easier to digest than any other of the sweet fruits. They have been said to produce lice when eaten as a common food; but this seems to be entirely without foundation. The reason of this supposition seems to be, that in the countries where they grow naturally, they make the principal food of the poor people, who are generally troubled with these vermin. The wood of the fig-tree is not subject to rot: and has therefore been used for making of coffins, in which embalmed bodies were put. Mr Hasselquist affirms, that he saw in Egypt coffins made of this kind of wood, which had been preserved sound for 2000 years.

FIDD, an iron pin used at sea to splice or fasten ropes together; it is made tapering and sharp at one end. There are also fidds of wood, which are much larger than the iron ones.

The pin also in the heel of the topmast, which bears it upon the ches-tree, is called a *fidd*.

FIDD-Hammer, is used for a hammer, the handle of which is a fidd, or made tapering into that form.

FIDDLE. See *VIOLIN*.

FIDDLE-Wood. See *CITHAREXELON*.

FIDDES (Richard), a learned divine and polite writer, was born in 1671, and educated at Oxford. He was presented to the living of Halsham in Yorkshire, where he was so admired for the sweetness of his voice, and the gracefulness of his delivery, that the people for several miles round flocked to his sermons. Coming to London in 1712, he was, by the favour of Dean Swift, introduced to the earl of Oxford, who made him one of his chaplains, and the queen soon after appointed him chaplain to the garrison at Hull: but losing his patrons upon the change of the ministry, he lost his chaplainship; and being obliged to apply himself to writing, composed, 1. *A Body of Divinity*; 2. *The Life of Cardinal Wolsey*; 3. *A Treatise of Morality*, &c. He died in 1725.

FIDE-JUSSORES Affidui. See *ASSIDUUS*.

FIDE-Jussor, in the civil law, is a surety, or one that obliges himself in the same contract with a principal, for the greater security of the creditor or stipulator.

FIDEI-COMMISSUM, in Roman antiquity, an estate left in trust with any person for the use another. See *TRUSTEE*.

FIDENA, or *FIDENE*, (anc. geog.) a town of the Sabines, five miles to the north of Rome, where traces of it are still to be seen. Fidenates the people (Livy.)

FIDES, *FAITH* or *FIDELITY*, one of the virtues deified by the Pagans. She had a temple near the Capitol, founded by Numa Pompilius; but no animals were offered, or blood spilt, in her sacrifices. During the performance of her rites, her priests appeared in white vestments, with their heads and hands covered with linen, to show that fidelity ought to be sacred.

FIDIUS, in Pagan worship, a god who presided over alliances and promises. This deity, which the Romans borrowed from the Sabines, was also called *Sancus*, *Semon*, and *Semi-pater*.

FIELD, in agriculture, a piece of ground inclosed, whether for tillage or pasture.

FIELD, in heraldry, is the whole surface of the shield or the continent, so called because it containeth those achievements anciently acquired in the field of battle. It is the ground on which the colours, bearing, metals, turs, charges, &c. are represented. Among the modern heralds, field is less frequently used in blazoning than shield or escutcheon. See the article *SHIELD*, &c.

FIELD-Book, in surveying, that wherein the angles, stations, distances, &c. are set down.

FIELD-Colours, in war, are small flags of about a foot and a half square, which are carried along with the quarter-master general, for marking out the ground for the squadrons and battalions.

FIELD-Fare, in ornithology. See *TURDUS*.

FIELD-Officers, in the art of war. See *OFFICER*.

FIELD-Pieces, small cannons, from three to twelve pounders, carried along with the army in the field.

FIELD-Staff, a weapon carried by the gunners, about the length of a halbert, with a spear at the end; having on each side ears screwed on, like the cock of a match-lock, where the gunners screw in lighted matches when

Fiddle
||
Field.

Field
Fife.

when they are upon command; and then the field-staffs are said to be armed.

FIELD-Works, in fortification, are those thrown up by an army in besieging a fortress, or by the besieged to defend the place. Such are the fortifications of camps, highways, &c.

Elysian FIELDS. See ELYSIAN.

FIELDING (Henry), a well known writer of the present age, son of lieutenant-general Fielding who served under the duke of Marlborough, was born in 1707. He had four sisters; of whom Sarah is well known, as writer of *The Adventures of David Simple*. On the death of his mother, his father married again; and Sir John Fielding, who succeeded him in the commission of the peace for Middlesex, was his brother by this marriage. Henry was sent to study at Leyden; but a failure in his remittances obliged him to return in two years, when his own propensity to gaiety and profusion drove him to write for the stage at 20 years of age. His first dramatic piece, *Love in several Masques*, which was well received, appeared in 1727: and all his plays and farces, to the amount of 18, were written before the year 1727: and many of them are still acted with applause. While he was thus employed, he married a young lady with 1500*l.* fortune, and inherited an estate of 200*l.* a-year from his mother: all which, though upon the plan of retiring into the country, he contrived to dissipate in three years; and then applied himself to the study of the law for a maintenance. In losing his fortune, he acquired the gout; which rendering it impossible for him to attend the bar, he with a shattered constitution had recourse to many extempore applications of his pen for immediate supplies; until, soon after the late rebellion, he accepted the office of acting justice for Middlesex, an employment much more profitable than honourable in the public esteem. Reduced at length by the fatigues of this office, and by a complication of disorders, he by the advice of his physicians went to Lisbon, where he died in 1754. He wrote a great number of fugitive pamphlets and periodical essays; but is chiefly distinguished by his *Adventures of Joseph Andrews*, and *History of Tom Jones*. His works have been collected and published, with his life prefixed, by Mr Murphy.

FIENUS (Thomas), an ingenious and learned physician, born at Antwerp in 1566. He went into Italy to study physic under Mercurialis and Aldrovandus; and on his return distinguished himself so much in the university of Louvain, that he was there chosen professor of physic, and was afterwards made physician to the duke of Bavaria. He wrote several works, among which were, *De viribus imaginationis*; and *De formatione fetus*. He died at Louvain in 1631.

FIERI FACIAS, in law, a writ that lies where a person has recovered judgment for a debt or damages in the courts against one, by which the sheriff is commanded to levy the debt and damages on the defendant's goods and chattels.

FIFE, in music, is a sort of wind-instrument, being a small pipe. See PIPE.

FIFE, a county of Scotland, bounded on the west by Clackmannan and Perthshire, on the north by Perthshire only, on the north-east by the river Tay, on the

east by the German ocean, and on the south by the Frith of Forth. It is about 32 miles long, and 17 broad; though along the coast, from Crail to Culrofs, it extends about 40 miles in length. The face of the country is various. Towards the west it is mountainous, having the Lomond hills rising to a great height; to the east it is flat, well-cultivated, and produces grain of all kinds in great plenty. It is full of towns; and has many good bays and harbours, which breed great numbers of hardy seamen. Formerly these towns carried on very extensive trade, but now are gone into decay; though, being all royal boroughs, they send several members to parliament. The hills are covered with sheep and black cattle; coal, with which the county abounds, is shipped off in great quantities; and the linen-manufacture is carried on to a considerable extent. The principal rivers are the Leven and the Eden, which produce trout and other fish of various kinds.—Fife is the most populous county in Scotland, having one full synod and four presbyter-seats within itself. It sends one member to parliament; and gives an Irish title of *earl* to the Duffs of Braco, the descendants of the ancient Thanes of Fife. Cupar is the county-town.

FIFE-Rails, in a ship, are those that are placed on banisters, on each side of the top of the poop, and so along with haunces or falls. They reach down to the quarter-deck, and to the stair of the gang-way.

FIFTH, in music. See INTERVAL.

FIG, or **FIG-TREE**. See FICUS.

FIGWORT, a plant called by the botanists *SCROPHULARIA*.

FIGURAL, **FIGURATE**, or *Figurative*, a term applied to whatever is expressed by obscure resemblances. The word is chiefly applied to the types and mysteries of the Mosaic law; as also to any expression which is not taken in its primary and literal sense.

FIGURE, in physics, expresses the surface or terminating extremities of any body.

FIGURES, in arithmetic, are certain characters, whereby we denote any number which may be expressed by any combination of the nine digits, &c. See ARITHMETIC.

FIGURE, among divines, is used for the mysteries represented under certain types.

FIGURE, in dancing, denotes the several steps which the dancer makes in order and cadence, considered as they mark certain figures on the floor. See DANCING.

FIGURE, in painting and designing, denotes the lines and colours which form the representation of any animal, but more particularly of a human personage. See the article PAINTING.

FIGURE, in the manufactures, is applied to the various designs represented or wrought on velvets, damasks, taffeties, sattins, and other stuffs and cloths.

The most useful figures for such designs are flowers, imitated from the life; or grotesques, and compartments of pure fancy. Representations of men, beasts, birds, and landscapes, have only been introduced since the taste for the Chinese stuffs, particularly those called *furees*, began to prevail among us. It is the woof of the stuff that forms the figures; the warp only serves for the ground. In working figured stuffs, there is required a person to show the workman how far

Fife
Figure.

Figure. far he must raise the threads of the warp, to represent the figure of the design with the woof, which is to be passed across between the threads thus raised. This some call *reading of the design*.

For the figures on tapestry, brocade, &c. See TAPESTRY, &c.

For those given by the calenders, printers, &c. see CALENDER, &c.

FIGURE, in logic, denotes a certain order and disposition of the middle term in any syllogism.

Figures are fourfold. 1. When the middle term is the subject of the major proposition, and the predicate of the minor, we have what is called the first figure. 2. When the middle term is the predicate of both the premises, the syllogism is said to be in the second figure. 3. If the middle term is the subject of the two premises, the syllogism is in the third figure: and, lastly, by making it the predicate of the major, and subject of the minor, we obtain syllogisms in the fourth figure. Each of these figures has a determinate number of moods, including all the possible ways in which propositions differing in quantity or quality can be combined, according to any disposition of the middle term, in order to arrive at a just conclusion. See LOGIC.

FIGURE, in composition. See ORATORY; also ALLEGORY, APOSTROPHE, HYPERBOLE, METAPHOR, PERSONIFICATION, &c.

Elem. of Criticism.

A **FIGURE**, the means or instrument conceived to be the agent. When we survey a number of connected objects, that which makes the greatest figure employs chiefly our attention; and the emotion it raises, if lively, prompts us even to exceed nature in the conceptions we form of it. Take the following examples.

For Neleus' son Alcides' rage had slain.

A broken rock the force of Pirus threw.

In these instances, the rage of Hercules and the force of Pirus, being the capital circumstances, are so far exalted as to be conceived the agents that produce the effects.

In the first of the following instances, hunger being the chief circumstance in the description, is itself imagined to be the patient.

Whose hunger has not tasted food these three days.

Jane Shore.

As when the force
Of subterranean wind transports a hill.

Paradise Lost.

As when the potent rod

Of Amram's son, in Egypt's evil day

Wav'd round the coast, upcall'd a pitchy cloud

Of locusts,

Paradise Lost.

A **FIGURE**, which, among related objects, extends the properties of one to another. This figure is not dignified with a proper name, because it has been overlooked by writers. *Giddy brink*, *jovial wine*, *daring wound*, are examples of this figure. Here are adjectives that cannot be made to signify any quality of the substantives to which they are joined: a *brink*, for example, cannot be termed *giddy* in a sense, either proper or figurative, that can signify any of its qualities or attributes. When we examine attentively the expression, we discover, that a *brink* is termed *giddy* from producing that effect in those who stand on it: in the same manner, a wound is said to be *daring*, not with respect to itself, but with respect to the boldness of the person who in-

flicts it: and wine is said to be *jovial*, as inspiring mirth and jollity. Thus the attributes of one subject are extended to another with which it is connected; and the expression of such a thought must be considered as a figure, because the attribute is not applicable to the subject in any proper sense.

How we are to account for this figure, which we see lies in the thought, and to what principle shall we refer it? Have poets a privilege to alter the nature of things, and at pleasure to bestow attributes upon a subject to which they do not belong? It is observed †, that the mind passeth easily and sweetly along a train of connected objects; and, where the objects are intimately connected, that it is disposed to carry along the good or bad properties of one to another; especially when it is in any degree inflamed with these properties. From this principle is derived the figure under consideration. Language, invented for the communication of thought, would be imperfect, if it were not expressive even of the slightest propensities and more delicate feelings: but language cannot remain so imperfect among a people who have received any polish; because language is regulated by internal feeling, and is gradually improved to express whatever passes in the mind. Thus, for example, when a sword in the hand of a coward is termed a *coward sword*, the expression is significative of an internal operation; for the mind, in passing from the agent to its instrument, is disposed to extend to the latter the properties of the former. Governed by the same principle, we say *listening fear* by extending the attribute *listening* of the man who listens, to the passion with which he is moved. In the expression *bold deed*, or *audax facinus*, we extend to the effect what properly belongs to the cause. But not to waste time by making a commentary upon every expression of this kind, the best way to give a complete view of the subject, is to exhibit a table of the different relations that may give occasion to this figure. And in viewing the table, it will be observed, that the figure can never have any grace but where the relations are of the most intimate kind.

1. An attribute of the cause expressed as an attribute of the effect.

Audax facinus.

Of yonder fleet a bold discovery make.

An impious mortal gave the daring wound.

To my advent'rous song.

That with no middle flight intends to soar. *Paradise Lost.*

2. An attribute of the effect expressed as an attribute of the cause.

Quos periisse ambos misero censebam in mari, *Plautus.*

No wonder, fallen such a pernicious height.

Paradise Lost.

3. An effect expressed as an attribute of the cause.

Jovial wine, Giddy brink, Drowsy night, Musing midnight, Panting height, Astonish'd thought, Mournful gloom.

Casting a dim religious light.

MILTON, *Comus.*

And the merry bells ring round,

And the jocund rebecks sound.

MILTON, *Allegro.*

4. An attribute of a subject bestowed upon one of its parts or members.

Longing arms.

It was the nightingale, and not the lark,

That pierc'd the fearful hollow of thine ear.

Romeo and Juliet, act 3, sc. 7.

—Oh,

Figure.

2 Vide
Elem. of Criticism,
ch. ii. part
1, § 6.

Figure.

Oh, lay by
Those most ungentle looks and angry weapons :
Unless you mean my griefs and killing fears
Should stretch me out at your *relentless* feet.
Fair Penitent, act 3.

And ready now
To stoop with *wearied* wing, and *willing* feet,
On the bare outside of this world. *Paradise Lost, b. 3.*

5. A quality of the agent given to the instrument with which it operates.

Why peep your *coward* swords half out their shells?

6. An attribute of the agent given to the subject upon which it operates.

High-climbing hill, *Milton.*

7. A quality of one subject given to another.

Ecce, beatis nunc Arabum invades
Gazis. Horat. Carm. l. 1. ode 29.

When *fapless* age, and weak unable limbs,
Should bring thy father to his *drooping* chair.

Shakespeare.

By art, the pilot through the boiling deep,
And howling tempest, steers the *fearless* ship.

Iliad, xxiii. 385.

Then, nothing loth, th' *enamour'd* fair he led,
And sunk transported on the *conscious* bed.

Odyssey, viii. 337.

A *stupid* moment motionless she stood.

Summer, l. 1336.

8. A circumstance connected with a subject, expressed as a quality of the subject.

Breezy summit.

'Tis ours the chance of *fighting* fields to try.

Iliad, i. 301.

Oh? had I dy'd before that *well-fought* wall.

Odyssey, v. 395.

From this table it appears, that the adorning a cause with an attribute of the effect, is not so agreeable as the opposite expression. The progress from cause to effect is natural and easy : the opposite progress resembles retrograde motion *; and therefore *panting height, astonish'd thought*, are strained and uncouth expressions, which a writer of taste will avoid.

* See PERCEPTION and Ideas in a Train.

It is not less strained, to apply to a subject in its present state, an epithet that may belong to it in some future state :

Submersasque obrue puppes.

Æneid, i. 73.

And mighty *ruins* fall.

Iliad, v. 411.

Impious sons their *mangled* fathers wound.

Another rule regards this figure, That the property of one subject ought not to be bestowed upon another with which that property is incongruous.

K. Rich. — How dare thy joints forget
To pay their *awful* duty to our presence?

Richard II. act 3. sc. 6.

The connection between an awful superior and his submissive dependent is so intimate, that an attribute may readily be transferred from the one to the other : but awfulness cannot be so transferred, because it is inconsistent with submission.

FIGURE of Speech, as peculiarly distinguished from the above and from those first referred to.] Under the article METAPHOR and Allegory, a figure of speech is defined, "The using a word in a sense different from what is proper to it;" and the new or uncommon sense of the word is termed the figurative sense. The figurative sense must have a relation to that which is

proper, and the more intimate the relation is, the figure is the more happy. How ornamental this figure is to language, will not be readily imagined by any one who hath not given peculiar attention; and therefore we shall endeavour to unfold its capital beauties and advantages. In the first place, a word used figuratively, or in a new sense, suggests at the same time the sense it commonly bears : and thus it has the effect to present two objects ; one signified by the figurative sense, which may be termed the principal object ; and one signified by the proper sense, which may be termed accessory : the principal makes a part of the thought ; the accessory is merely ornamental. In this respect, a figure of speech is precisely similar to concordant sounds in music, which, without contributing to the melody, make it harmonious.

To explain the matter by examples. *Youth*, by a figure of speech, is termed the morning of life : This expression signifies *youth*, the principal object which enters into the thought ; it suggests, at the same time, the proper sense of *morning* ; and this accessory object, being in itself beautiful, and connected by resemblance to the principal object, is not a little ornamental. *Imperious ocean* is an example of a different kind, where an attribute is expressed figuratively : Together with *stormy*, the figurative meaning of the epithet *imperious*, there is suggested its proper meaning, viz. the stern authority of a despotic prince ; and these two are strongly connected by resemblance. Upon this figurative power of words, *Vida* descants with elegance, *Poet. lib. iii. 44.*

In the next place, this figure possesses a signal power of aggrandising an object, by the following means. Words which have no original beauty but what arises from their sound, acquire an adventitious beauty from their meaning : a word signifying any thing that is agreeable, becomes by that means agreeable ; for the agreeableness of the object is communicated to its name. This acquired beauty, by the force of custom, adheres to the word even when used figuratively ; and the beauty received from the thing it properly signifies is, communicated to the thing which it is made to signify figuratively. Consider the foregoing expression *Imperious ocean*, how much more elevated it is than *Stormy ocean*.

Thirdly, This figure hath a happy effect by preventing the familiarity of proper names. The familiarity of a proper name is communicated to the thing it signifies by means of their intimate connection ; and the thing is thereby brought down in our feeling. This bad effect is prevented by using a figurative word instead of one that is proper ; as for example, when we express the sky by terming it the *blue vault of heaven* ; for though no work of art can compare with the sky in grandeur, the expression, however, is relished, because it prevents the object from being brought down by the familiarity of its proper name. With respect to the degrading the familiarity of proper names, *Vida* has the following passage :

Hinc si dura mihi passus dicendus Ulysses,
Non illum vero memorabo nomine, sed qui
Et motes hominum multorum vidit, et urbes,
Naufragus everse post sæva incendia Trojæ.

Poet. lib. ii. l. 46.

Lastly, By this figure, language is enriched, and rendered more copious ; in which respect, were there

Figure.

Elem. of Criticism.

Figure. no other, a figure of speech is a happy invention. This property is finely touched by Vida; *Poet. lib. iii. 90.*

The beauties we have mentioned belong to every figure of speech. Several other beauties peculiar to one or other sort, we shall have occasion to remark afterward.

Not only subjects, but qualities, actions, effects, may be expressed figuratively. Thus, as to subjects, *gates of breath* for the lips, *the watery kingdom* for the ocean. As to qualities, *fierce* for stormy, in the expression *Fierce winter*; *altus* for profundus, *Altus puteus*, *Altum mare*; *breathing* for perspiring, *Breathing plants*. Again, as to actions, *The sea rages*, *Time will melt her frozen thoughts*, *Time kills grief*. An effect is put for the cause, as *lux* for the sun; and a cause for the effect, as *bom labore* for corn. The relation of resemblance is one plentiful source of figures of speech; and nothing is more common than to apply to one object the name of another that resembles it in any respect: Height, size, and worldly greatness, resemble not each other; but the emotions they produce resemble each other, and, prompted by this resemblance, we naturally express worldly greatness by height or size: One feels a certain uneasiness in seeing a great depth; and, hence depth is made to express any thing disagreeable by excess, as *depth of grief*, *depth of despair*: Again, height of place, and time long past produce similar feelings; and hence the expression, *Ut altius repetam!* Distance in past time, producing a strong feeling, is put for any strong feeling; *Nihil mihi antiquius nostra amicitia*: Shortness with relation to space, for shortness with relation to time; *Brevis esse laboro, obscurus fio*: Suffering a punishment resembles paying a debt; hence *pendere penas*. In the same manner, light may be put for glory, sunshine for prosperity, and weight for importance.

Many words, originally figurative, having, by long and constant use, lost their figurative power, are degraded to the inferior rank of proper terms. Thus the words that express the operation of the mind, have in all languages been originally figurative: the reason holds in all, that when these operations came first under consideration, there was no other way of describing them but by what they resembled: it was not practicable to give them proper names, as may be done to objects that can be ascertained by sight and touch. A *soft nature*; *jarring tempers*, *weight of woe*, *pompous phrase*, *beget compassion*, *assuage grief*, *break a vow*, *bend the eye downward*, *shower down curses*, *drown'd in tears*, *wrapt in joy*, *warm'd with eloquence*, *loaded with spoils*, and a thousand other expressions of the like nature, have lost their figurative sense. Some terms there are that cannot be said to be altogether figurative or altogether proper: originally figurative, they are tending to simplicity, without having lost altogether their figurative power. Virgil's *Regina faucibus cura*, is perhaps one of these expressions; with ordinary readers, *faucibus* will be considered as expressing simply the effect of grief; but one of a lively imagination will exalt the phrase into a figure.

For epitomising this subject, and at the same time for giving a clear view of it, Lord Kames * gives a list of the several relations upon which figures of speech are commonly founded. This list he divides into two

tables; one of subjects expressed figuratively, and one of attributes.

Figure.

TAB. I. *Subjects expressed figuratively.*

1. A word proper to one subject employed figuratively to express a resembling subject.

There is no figure of speech so frequent, as what is derived from the relation of resemblance. Youth, for example, is dignified figuratively by the *morning* of life. The life of a man resembles a natural day in several particulars: the morning is the beginning of a day, youth the beginning of life; the morning is cheerful, so is youth, &c. By another resemblance, a bold warrior is termed the *thunderbolt* of war; a multitude of troubles, a *sea* of troubles.

This figure, above all others, affords pleasure to the mind by variety of beauties. Besides the beauties abovementioned, common to all sorts, it possesses in particular the beauty of a metaphor or of a simile: a figure of speech built upon resemblance, suggests always a comparison between the principal subject and the accessory; whereby every good effect of a metaphor or simile may, in a short and lively manner, be produced by this figure of speech.

2. A word proper to the effect employed figuratively to express the cause.

Lux for the sun; *Shadow* for cloud. A helmet is signified by the expression *glittering terror*; a tree by *shadow* or *umbrage*. Hence the expression,

Nec habet Pelion umbras.

Ovid.

Where the dun umbrage hangs.

Spring, l. 1023.

A wound is made to signify an arrow:

Vulnere non pedibus te consequar.

Ovid.

There is a peculiar force and beauty in this figure: the word which signifies figuratively the principal subject, denotes it to be a cause by suggesting the effect.

3. A word proper to the cause employed figuratively to express the effect.

Bomque labores for corn. *Sorrow* or *grief* for tears.

Again Ulysses veil'd his pensive head;
Again, unmann'd, a show'r of sorrow shed.
Streaming Grief his faded cheek bedew'd.

Blindness for darkness:

Cæcis erramus in undis.

Æneid. iii. 206.

There is a peculiar energy in this figure, similar to that in the former: the figurative name denotes the subject to be an effect, by suggesting its cause.

4. The things being intimately connected, the proper name of the one employed figuratively to signify the other.

Day for light. *Night* for darkness: and hence, *A sudden night*. *Winter* for a storm at sea:

Interea magno misceri murmure pontum,
Emssamque Hyemem sensit Neptunus. Æneid i. 128.

This last figure would be too bold for a British writer, as a storm at sea is not inseparably connected with winter in that climate.

5. A word proper to an attribute, employed figuratively to denote the subject.

Youth and *beauty* for those who are young and beautiful:

Youth and beauty shall be laid in dust.

Majesty

* Elem. of Criticism, II. 305.

Figure.

Majesty for the king :

What art thou, that usurp'st this time of night,
Together with that fair and warlike form
In which the *Majesty* of buried Denmark
Did sometime march ? *Hamlet, act I. sc. I.*

Or have ye chosen this place
After the toils of battle, to repose
Your weary'd virtue ? *Paradise Lost.*

Verdure for a green field. *Summer, l. 301.*

Speaking of cranes,

The pigmy nations, wounds and death they bring,
And all the war descends upon the wing. *Iliad, iii. 10.*
Cool age advances venerably wise. *Iliad, iii. 149.*

The peculiar beauty of this figure arises from suggesting an attribute that embellishes the subject, or puts it in a stronger light.

6. A complex term employed figuratively to denote one of the component parts.

Funus for a dead body. *Burial* for a grave.

7. The name of one of the component parts instead of the complex term.

Tæda for a marriage. The *East* for a country situated east from us. *Jovis vestigia servat*, for imitating Jupiter in general.

8. A word signifying time or place, employed figuratively to denote what is connected with it.

Clime for a nation, or for a constitution of government : hence the expression, *Merciful clime*, *Fleecy winter* for snow, *Seculum felix*.

9. A part for the whole.

The *pole* for the earth. The *head* for the person :

Triginta minas pro capite tuo dedi. *Plautus.*

Tergum for the man :

Fugiens tergum. *Ovid.*

Vultus for the man :

Jam fulgor armorum fugaces *Horat.*

Terret equos, equitumque vultus.

Quis desiderio sit pudor aut modus *Horat.*

Tam chari capitis ? *Horat.*

Dumque virent genua ? *Horat.*

Thy growing virtues justify'd my cares,
And promis'd comfort to my silver hairs. *Iliad, ix. 616.*

—Forthwith from the pole he rears

His mighty stature. *Paradise Lost.*

The silent heart with grief assails. *Parnel.*

The peculiar beauty of this figure consists in marking that part which makes the greatest figure.

10. The name of the container, employed figuratively to signify what is contained.

Grove for the birds in it ; Vocal grove. *Ships* for the seamen ; Agonizing ships. *Mountains* for the sheep pasturing upon them, *Bleating mountains*. *Zacynthus*, *Ithaca*, &c. for the inhabitants. *Ex mæstis domibus*, *Livy*.

11. The name of the sustainer, employed figuratively to signify what is sustained.

Altar for the sacrifice. *Field* for the battle fought upon it, *Well-fought field*.

12. The name of the materials, employed figuratively to signify the things made of them.

Ferrum for gladius.

13. The names of the Heathen deities, employed figuratively to signify what they patronise.

Jove for the air, *Mars* for war, *Venus* for beauty, *Cupid* for love, *Ceres* for corn, *Neptune* for the sea, *Vulcan* for fire.

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This figure bestows great elevation upon the subject ; and therefore ought to be confined to the higher strains of poetry.

TABLE II. *Attributes expressed figuratively.*

1. When two attributes are connected, the name of the one may be employed figuratively to express the other.

Purity and virginity are attributes of the same person : hence the expression, *Virgin snow*, for pure snow.

2. A word signifying properly an attribute of one subject, employed figuratively to express a resembling attribute of another subject.

Tottering state. *Imperious ocean*. *Angry flood*. *Raging tempest*. *Shallow fears*.

My sure divinity shall bear the shield,
And edge thy sword to reap the glorious field.

Odyssey, xx. 61.

Black omen, for an omen that portends bad fortune.

Ater omen. *Virgil.*

The peculiar beauty of this figure arises from suggesting a comparison.

3. A word proper to the subject, employed to express one of its attributes.

Mens for intellectus. *Mens* for a resolution :

Istam, oro, exue mentem.

4. When two subjects have a resemblance by a common quality, the name of the one subject may be employed figuratively to denote that quality in the other :

Summer life for agreeable life.

5. The name of the instrument made to signify the power of employing it :

—Melpomene, cui liquidam pater
Vocem cum cithara dedit.

The ample field of figurative expression displayed in these tables, affords great scope for reasoning. Several of the observations relating to metaphor*, are applicable to figures of speech : these shall be slightly retouched, with some additions peculiarly adapted to the present subject.

* See Metaphor.

1. As the figure under consideration is built upon relation, we find from experience, and it must be obvious from reason, that the beauty of it depends on the intimacy of the relation between the figurative and proper sense of the word. A slight resemblance, in particular, will never make this figure agreeable : the expression, for example, *Drink down a secret*, for listening to a secret with attention, is harsh and uncouth, because there is scarce any resemblance between *listening* and *drinking*. The expression *weighty crack*, used by Ben Johnson for *loud crack*, is worse if possible : a loud sound has not the slightest resemblance to a piece of matter that is weighty.

Phœbus ! let acts of gods, and heroes old,
What ancient bards in hall and bow'r have told,
Attempter'd to the lyre, your voice employ,
Such the pleas'd ear will drink with silent joy.

Odyssey, i. 433.

Streptumque exterritus hausit. *Æneid, vi. 559.*

—Write, my queen,
And with mine eyes I'll drink the words you send.

Cymbeline, act I. sc. 2.

As thus th' effulgence tremulous I drink.

Summer, l. 1684.

G g

Nequ

Figure.

Neque audit currus habenas.

Georg. i. 514.

O prince! (Lycaon's valiant son reply'd),
As shine the steeds, be thine the task to guide.
The horses practis'd to their lord's command,
Shall bear the rein, and answer to thy hand. *Iliad*, v. 288:

The following figures of speech seem altogether wild and extravagant, the figurative and proper meaning having no connection whatever. *Moving softness, Freshness breathes, Breathing prospect, Flowing spring, Dewy light, Lucid coolness*, and many others of this false coin, may be found in Thomson's *Seasons*.

2. The proper sense of the word ought to bear some proportion to the figurative sense, and not soar much above it, nor sink much below it. This rule, as well as the foregoing, is finely illustrated by Vida, *Poet.* iii. 148.

3. In a figure of speech, every circumstance ought to be avoided that agrees with the proper sense only, not with the figurative sense; for it is the latter that expresses the thought, and the former serves for no other purpose but to make harmony:

Zacynthus green with ever-shady groves,
And Ithaca, presumptuous boast their loves;
Obtruding on my choice a second lord,
They press the Hymenean rite abhor'd.

Odyssey, xix. 152.

Zacynthus here standing figuratively for the inhabitants, the description of the island is quite out of place: it puzzles the reader, by making him doubt whether the word ought to be taken in its proper or figurative sense.

Write, my queen,
And with mine eyes I'll drink the words you send,
Though ink be made of gall. *Cymbeline*, act 1. sc. 2.

The disgust one has to drink ink in reality, is not to the purpose where the subject is drinking ink figuratively.

4. To draw consequences from a figure of speech, as if the word were to be understood literally, is a gross absurdity; for it is confounding truth with fiction:

Be Moubay's sins so heavy in his bosom,
That they may break his foaming courser's back,
And throw the rider headlong in the lists,
A caitiff recreant to my cousin Hereford.

Richard II. act 1. sc. 3.

Sin may be imagined heavy in a figurative sense: but weight in a proper sense belongs to the accessory only; and therefore to describe the effects of weight, is to desert the principal subject, and to convert the accessory into a principal:

Cromwell. How does your Grace?

Wolfey. Why, well;

Never so truly happy, my good Cromwell.
I know myself now, and I feel within me
A peace above all earthly dignities,
A still and quiet conscience. The king has cur'd me,
I humbly thank his Grace: and, from these shoulders,
These ruin'd pillars, out of pity, taken
A load would sink a navy, too much honour.

Henry VIII. act 3. sc. 6.

Ulysses speaking of Hector:

I wonder now how yonder city stands,
When we have here the base and pillar by us.

Troilus and Cressida, act 4. sc. 9.

Othello. No; my heart is turn'd to stone: I strike it, and it hurts my hand.

Othello, act 4. sc. 5.

Figure.

Not less, even in this despicable now,
Than when my name fill'd Afric with affrights,
And froze your hearts beneath your torrid zone.

Don Sebastian, King of Portugal, act 1.

How long a space since first I lov'd, it is!

To look into a glass I fear,
And am surpris'd with wonder, when I miss
Grey hairs and wrinkles there.

Cowley, vol. 1. p. 26.

I chose the flourishing'ft tree in all the park,
With freshest boughs, and fairest head:

I cut my love into its gentle bark,
And in three days behold 'tis dead;
My very written flames so violent be,
They've burnt and wither'd up the tree.

Cowley, vol. 1. p. 136.

Ah, mighty Love, that it were inward heat
Which made this precious limbeck sweat!

But what, alas! ah, what does it avail
That she weeps tears so wond'rous cold,
As scarce the ass's hoof can hold,
So cold, that I admire they fall not hail?

Cowley, vol. 1. p. 132:

Such a play of words is pleasant in a ludicrous poem.

Almeria. O Alphonso, Alphonso!
Devouring seas have wash'd thee from my sight,
No time shall rase thee from my memory;
No, I will live to be thy monument:
The cruel ocean is no more thy tomb;
But in my heart thou art interr'd.

Mourning Bride, act 1. sc. 1.

This would be very right, if there were any inconsistency in being interred in one place really, and in another place figuratively.

From considering, that a word used in a figurative sense suggests at the same time its proper meaning, we discover a fifth rule, That we ought not to employ a word in a figurative sense, the proper sense of which is inconsistent or incongruous with the subject: for every inconsistency, and even incongruity, though in the expression only and not real, is unpleasant:

Interea genitor Tyberini ad fluminis undam
Vulnera siccat lymphis

Æneid, x. 833.

Tres adeo incertos cæca caligine soles
Erramus pelago, totidem sine sidere noctes.

Æneid, iii. 203.

The foregoing rule may be extended to form a sixth, That no epithet ought to be given to the figurative sense of a word that agrees not also with its proper sense:

Dicat Opuntia

Frater Megillæ, quo beatus

Vulnere.

Horat. Carm. lib. 1. ode 27.

Parcus deorum cultor, et infrequens,

Infantis dum sapientia

Consultus erro.

Horat. Carm. lib. 1. ode 54.

Seventhly, The crowding into one period or thought different figures of speech, is not less faulty than crowding metaphors in that manner: the mind is distracted in the quick transition from one image to another, and is puzzled instead of being pleased:

I am of ladies most deject and wretched,
That suck'd the honey of his music vows.
My bleeding bosom sickens at the sound.

Hamlet.

Odyssey, i. 439.

Ah miser,

Quanta laboras in Charybdi!

Digne puer meliore flamma.

Quæ faga, quis te solvere Theſſalis
Magus venenis, quis poterit deus?

Vix

Figure.

Vix illigatum tetriformi
Pegasus expedit Cbimera.

Horat. Carm. lib. I. ode 27.

Eighthly, if crowding figures be bad, it is still worse to graft one figure upon another: For instance,

While his keen falchion drinks the warriors lives.

Iliad, xi. 211.

A falchion drinking the warriors blood is a figure built upon resemblance, which is passable. But then in the expression, *lives* is again put for *blood*; and by thus grafting one figure upon another, the expression is rendered obscure and unpleasant.

Ninthly, Intricate and involved figures, that can scarce be analysed, or reduced to plain language, are least of all tolerable:

Votis incendimus aras.

Æneid. iii. 279.

———Onerentque canistris

Dona laboratæ Cereris

Æneid. viii. 180.

Vulcan to the Cyclopes:

Arma acri faciendâ viro, nunc viribus usus,
Nunc manibus rapidis, omni nunc arte magistra.

Præcipitate moras.

Æneid. viii. 441.

———Huic gladio, perque ærea scuta.

Per tunicam squalentem auro, latus haurit apertum.

Æneid. x. 313.

Scriberis Vario fortis, et hostium

Victor, Mæonii carminis alite.

Horat. Carm. lib. I. ode 6.

Else shall our fates be number'd with the dead.

Iliad, v. 294.

Commatural death the fate of war confounds.

Iliad, viii. 85. and xi. 117.

Speaking of Proteous.

Instant he wears, exclusive of the rape,

The mimic force of every savage shape. *Odyssey*, iv. 563.

Rolling convulsive on the floor, is seen

The piteous object of a prostrate queen *Ibid* iv. 652.

The mingling tempest weaves its gloom. *Autumn*, 337.

A various sweetness swells the gentle race. *Ibid*. 640.

The distant water-fall swells in the breeze. *Winter*, 738.

In the tenth place, When a subject is introduced by its proper name, it is absurd to attribute to it the properties of a different subject to which the word is sometimes applied in a figurative sense:

Hear me, oh Neptune! thou whose arms are hurl'd
From shore to shore, and gird the solid world.

Odyssey. ix. 917.

Neptune is here introduced personally, and not figuratively for the ocean: the description therefore, which is only applicable to the latter, is altogether improper.

It is not sufficient that a figure of speech be regularly constructed, and be free from blemish: it requires taste to discern when it is proper, when improper; and taste perhaps is our only guide. One, however, may gather from reflections and experience, that ornaments and graces suit not any of the dispiriting passions, nor are proper for expressing any thing grave and important. In familiar conversation, they are in some measure ridiculous: Prospero, in the *Tempest*, speaking to his daughter Miranda, says,

The fringed curtains of thine eyes advance,
And say what thou seest yond.

No exception can be taken to the justness of the figure; and circumstances may be imagined to make it

proper: but it is certainly not proper in familiar conversation.

In the last place, Though figures of speech have a charming effect when accurately constructed and properly introduced, they ought, however, to be scattered with a sparing hand: nothing is more luscious, and nothing consequently more satiating, than redundant ornaments of any kind.

FIGURE is used, in theology, for the mysteries represented or delivered obscurely to us under certain types or actions in the Old Testament. Thus manna is held a figure or type of the eucharist; and the death of Abel a figure of the sufferings of Christ.

Many divines and critics contend, that all the actions, histories, ceremonies, &c. of the Old Testament, are only figures, types, and prophecies, of what was to happen under the New. The Jews are supposed to have had the figures or shadows, and we the substance.

FIGURE is also applied in a like sense to profane matters: as the emblems, enigmas, fables, symbols, and hieroglyphics, of the ancients.

FIGURED, in general, something marked with figures.

The term *figured* is chiefly applied to stuffs, whereon the figures of flowers and the like, are either wrought or stamped.

FIGURED, in music, is applied either to simple notes or to harmony: to simple notes, as in these words *figured bass*, to express a bass whose notes carrying chords are subdivided into many other notes of lesser value; to harmony, when, by supposition and in a diatonic procedure, other notes than those which form the chord are employed. see SUPPOSITION.

To *figure* is to pass several notes for one; to form runnings or variations; to add some notes to the air, in whatever manner it be done; in short, it is to give to harmonious sounds a figure of melody, by connecting them with other intermediate sounds.

FILAGO, in botany: A genus of the polygamia superflua order, belonging to the syngenesia class of plants; and in the natural method ranking under the 49th order, *Compositæ*. The receptacle is naked; there is no pappus; the calyx is imbricated; the female florets placed among the scales of the calyx.

FILAMENT, in anatomy, natural history, &c. a term used in the same sense with fibre, for those fine threads whereof the flesh, nerves, skin, plants, roots, &c. are composed. See FIBRE.

Vegetable FILAMENTS form a substance of great use in the arts and manufactures: furnishing thread, cloth, cordage, &c.

For these purposes the filamentous parts of the *Cannabis* and *Linum*, or hemp and flax, are employed among us*. But different vegetables have been employed in different countries for the same uses. Putrefaction destroys the pulpy or fleshy matter, and leaves the tough filaments entire: By curiously putrefying the leaf of a plant in water, we obtain the fine flexible fibres which constituted the basis of the ribs and minute veins, and which now form as it were a skeleton of the leaf. Alkaline lixivium, in some degree, produce similar effects to putrefaction.

The Sieur de Flacourt, in his history of Madagascar, relates, that different kinds of cloth are prepared

Figure

Filaments.

* See Hemp
and Flax;
also Cotton.

Filaments. in that island from the filaments of the bark of certain trees boiled in strong lye; that some of these cloths are very fine, and approach to the softness of silk, but in durability come short of cotton; that others are coarser and stronger, and last thrice as long as cotton; and that of these the sails and cordage of his vessel were made. See also the article BARK.

The same author informs us, that the stalks of nettles are used for the like purposes in his own country, France. And Sir Hans Sloane relates, in one of his letters to Mr Ray, that he has been informed by several, that muslin and callico, and most of the Indian linens, are made of nettles.

In some of the Swedish provinces, a strong kind of cloth is said to be prepared from hop-stalks: and in the transactions of the Swedish academy for the year 1750, there is an account of an experiment made in consequence of that report. Of the stalks, gathered in autumn, about as many were taken, as equalled in bulk a quantity of flax that would have produced a pound after preparation. The stalks were put into water, and kept covered therewith during the winter. In March they were taken out, dried in a stove, and dressed as flax. The prepared filaments weighed nearly a pound, and proved fine, soft, and white: They were spun and woven into six ells of fine strong cloth. The author, Mr Shisler, observes, that hop-stalks take much longer time to rot than flax; and that, if not fully rotted, the woody part will not separate, and the cloth will neither prove white nor fine.

Hemp, flax, and all other vegetable filaments, and thread or cloth prepared from them, differ remarkably from wool, hair, silk, and other animal productions, not only in the principles into which they are resolvable by fire, but likewise in some of their more interesting properties, particularly in their disposition to imbibe colouring matters; sundry liquors, which give a beautiful and durable dye to those of the animal, giving no stain at all to those of the vegetable kingdom.

A solution of copper in aquafortis, which had been changed blue by an addition of volatile spirit, on being mixed with a little solution of tin, became turbid and greenish. Pieces of white silk and flannel boiled, without any previous preparation, in this mixture, received a bright deep yellow dye; whilst pieces of linen, prepared and unprepared, came out as colourless as they were put in.

Fishing-nets are usually boiled with oak-bark or other like astringents, which render them more lasting.—Those made of flax receive from this decoction a brownish colour, which, by the repeated alternations of water and air, is in a little time discharged, whilst the fine glossy brown, communicated by the same means to silken nets, permanently resists both the air and water, and stands as long as the animal filaments themselves. In like manner the stain of ink, or the black dye from solutions of iron, mixed with vegetable astringents, proves durable in silk and woollen; but from linen, the astringent matter is extracted by washing, and only the yellow iron-mould remains.

The red decoction of cochineal, which, heightened with a little solution of tin, gives the fiery scarlet dye to wool or silk that have been previously impregnated with solution of tartar, makes no impression upon linen or cotton prepared in the same manner. M. du

Fay informs us in the Memoirs of the French Academy for the year 1737, that having prepared a mixed cloth whose warp was of wool and the woof of cotton, and thoroughly blended the two together by fulling, he still found the cotton to resist the action of the scarlet liquor, and the wool to receive the same colour from it as wool by itself, the stuff coming out all over marbled fiery and white.

Many other instances of this kind are known too well to the callico-printer; whose grand desideratum it is, to find means of making linen receive the same colours that wool does. The physical cause of the difference is wholly unknown; and indeed, of the theory of dyes in general, we know as yet extremely little. (See DYEING.) Are animal filaments tubular, and the colouring atoms received within them? Are vegetable filaments solid, and the colour deposited on the surface? Or does not their different susceptibility of colour depend rather on the different intrinsic properties of the two? There are many instances of a like diversity, even in the metallic kingdom, where a mechanical difference in texture can scarcely be presumed to be the cause: Thus silver receives a deep stain from sulphureous or putrid vapours, or the yolk of a boiled egg, which have no effect upon tin.

FILAMENTS, among botanists. See BOTANY, p. 434, col. 1.

FILANDERS, in falconry, a disease in hawks, &c. consisting of filaments or strings of blood coagulated; and occasioned by a violent rupture of some vein, by which the blood, extravasating, hardens into these figures, and incommodes the reins, hips, &c.

FILANDERS, are also worms as small as thread, and about an inch long, that lie wrapt up in a thin skin or net, near the reins of an hawk, apart from either gut or gorge.

This malady is known by the hawk's poverty; by ruffling her tail; by her straining the fist, or perch, with her pounces; and lastly, by croaking in the night, when the filanders prick her. The disease proceeds from bad food; and must be remedied in time, to prevent its spreading over the whole body, and destroying the bird. These must not be killed as other worms are, for fear of imposthumes from their corruption, being incapable of passing away with the hawk's meat. They must only be stupified, to prevent their being offensive; and this done by giving the hawk a clove of garlic, after which she will feel nothing of the filanders for 40 days. It will be prudent in the falconer, when he observes the hawk poor and low, to give her a clove of garlic once a-month by way of prevention.

FILBERT, or FILBERD, the fruit of the corylus, or hazel. See CORYLUS.

FILE, among mechanics, a tool used in metal, &c. in order to smooth, polish, or cut.

This instrument is of iron or forged steel, cut in little furrows, with chissels and a mallet, this and that way, and of this or that depth, according to the grain or touch required. After cutting the file, it must be tempered with a composition of chimney-foot, very hard and dry, diluted and wrought up with urine, vinegar, and salt; the whole being reduced to the consistence of mustard. Tempering the files consists in rubbing them over with this composition, and covering them

Filaments
|
File.

File,
Filial.

them in loam; after which they are put in a charcoal fire, and taken out by that time they have acquired a cherry colour, which is known by a small rod of the same steel put in along with them. Being taken out of the fire, they are thrown into the cold spring-water; and when cold, they are cleaned with charcoal and a rag; and being clean and dry, are kept from rust by laying them up in wheat bran. Iron files require more heating than steel ones. Files are of different forms, sizes, cuts, and degrees of fineness, according to the different uses and occasions for which they are made. See FILING.

FILE, in the art of war, a row of soldiers, standing one behind another, which is the depth of the battalion or squadron. The files of a battalion of foot are generally three deep; as are sometimes those of a squadron of horse. The files must be straight and parallel one to another.

FILE, in law, a thread, string, or wire, upon which writs and other exhibits in courts and offices are fastened or filed, for the more safe keeping, and ready turning to the same. A file is a record of the court; and the filing of a process of a court makes it a record of it. An original writ may be filed after judgment given in the cause, issued forth before; declarations, &c. are to be filed, and affidavits must be filed, some before they are read in court, and some presently when read in court. Before filing a record removed by *certiorari*, the justices of B. R. may refuse to receive it, if it appears to be for delay, &c.; and remand it back for the expedition of justice: but if the *certiorari* be once filed, the proceedings below cannot be revived. An indictment, &c. cannot be amended after it is filed.

FILIAL, something belonging to the relation of son. See SON.

The divines usually distinguish between a *servile* and a *filial* fear. The most abandoned may have a servile fear of God, such as that of a slave to his master; but not a filial fear, *i. e.* a fear resulting from love and respect. See FEAR.

FILIAL Piety, the affectionate attachment of children to their parents; including in it love, reverence, obedience, and relief. These are duties prompted equally by nature and by gratitude, independent of the injunctions of religion. For where shall we find the person who hath received from any one benefits so great or so many, as children from their parents? And it may be truly said, that if persons are undutiful to their parents, they seldom prove good to any other relation. Profane history furnishes many fine examples of this amiable virtue; a few of which we shall select, according to the plan observed in other similar articles.

1. The Roman dictator T. Manlius having exercised great cruelty over the citizens, was cited at the expiration of his office to answer for his conduct. Among other things that were laid to his charge, he was accused of treating with barbarity one of his own sons. Manlius, according to Livy, had no other cause of complaint against this son than his having an impediment in his speech. For this reason he was banished far from the city, from his home, and the company of those of his own age and fortune, and condemned to servile works. All were highly exasperated against such inhuman conduct, except the son himself, who,

under the greatest concern that he should furnish matter of accusation against his father, resolved upon a most extraordinary method to relieve him. One morning, without apprising any body, he came to the city armed with a dagger, and went directly to the house of the tribune Pomponius, who had accused his father. Pomponius was yet in bed. Young Manlius sent up his name, and was immediately admitted by the tribune, who did not doubt but we was come to discover to him some new instances of his father's severity. But Manlius, as soon as he was left alone with the tribune, drew out his dagger, and presented it to his breast; declaring he would stab him that moment if he did not swear in the form he should dictate, "Never to hold the assembly of the people for accusing his father." Pomponius, who saw the dagger glittering at his breast, himself alone without arms, and attacked by a robust young man full of a bold confidence in his own strength, took the oath demanded of him; and afterwards confessed with a kind of complacency in the thing, and a sincerity which sufficiently argued he was not sorry for what he had done, that it was that violence which obliged him to desist from his design.

2. Among the multitude of persons who were proscribed under the second triumvirate of Rome, were the celebrated orator Cicero and his brother Quintus. The fate of the former, in endeavouring to make his escape, is related under the article CICERO. The latter found means to conceal himself so effectually at home, that the soldiers could not find him. Enraged at their disappointment, they put his son to the torture, in order to make him discover the place of his father's concealment; but filial affection was proof against the most exquisite torments. An involuntary sigh, and sometimes a deep groan, was all that could be extorted from the youth. His agonies were increased; but with amazing fortitude he still persisted in his resolution of not betraying his father. Quintus was not far off; and it may be imagined better than can be expressed, how his heart must have been affected with the sighs and groans of a son expiring in tortures to save his life. He could bear it no longer; but quitting the place of his concealment, he presented himself to the assassins, begging of them to put him to death, and dismiss the innocent youth, whose generous behaviour the triumvirs themselves, if informed of the fact, would judge worthy of the highest approbation. But the inhuman monsters, without being the least affected with the tears either of the father or the son, answered, that they both must die; the father because he was proscribed, and the son because he had concealed his father. Then a new contest of tenderness arose who should die first; but this the assassins soon decided, by beheading them both at the same time.—This anecdote is related by Appian, Dio, Plutarch, Valerius Maximus, and other historians.

3. Cinna, who scrupled no attempt, how atrocious soever, which could serve his purpose, undertook to get Pomponius Strabo murdered in his tent; but his son saved his life, which was the first remarkable action of Pompey the Great. The treacherous Cinna, by many alluring promises, had gained over one Terentius, a confidant of Pompey's, and prevailed on him to assassinate the general, and seduce his troops. Young Pompey

Filial.

Liv. l. 7.
c. 4, 5.Plut. in vita
Pomp.

Filial.

Pompey being informed of this design a few hours before it was to be put in execution, placed a faithful guard round the prætorium; so that none of the conspirators could come near it. He then watched all the motions of the camp, and endeavoured to appease the fury of the soldiers, who hated the general his father, by such acts of prudence as were worthy of the oldest commanders. However, some of the mutineers having forced open one of the gates of the camp, in order to desert to Cinna, the general's son threw himself flat on his back in their way, crying out, that they should not break their oath and desert their commander, without treading his body to death. By this means he put a stop to their desertion, and afterwards wrought so effectually upon them by his affecting speeches and engaging carriage, that he reconciled them to his father.

Curtius.

4. Olympias, Alexander's own mother, was of such an unhappy disposition, that he would never allow her to have any concern in the affairs of the government. She used frequently to make very severe complaints on that account; but he always submitted to her ill-humour with great mildness and patience. Antipater, one of his friends, having one day written along letter against her to the king then absent, the latter, after reading it, replied, "Antipater does not know that one single tear shed by a mother will obliterate ten thousand such letters as this." A behaviour like this, and such an answer, show at one and the same time, that Alexander was both an affectionate son and an able politician.

5. Epaminondas is universally acknowledged to have been one of the greatest generals and one of the best men which Greece ever produced. Before him the city of Thebes was not distinguished by any memorable action, and after him it was not famous for its virtues, but its misfortunes, till it sunk into its original obscurity; so that it saw its glory take birth and expire with this great man. The victory he obtained at Leuctra had drawn the eyes and admiration of all the neighbouring people upon Epaminondas, who looked upon him as the support of Thebes, as the triumphant conqueror of Sparta, as the deliverer of Greece: in a word, as the greatest man, and the most excellent captain, that ever was in the world. In the midst of this universal applause, so capable of making the general of an army forget the man for the victor, Epaminondas, little sensible to so affecting and so deserved a glory, "My joy (said he) arises from my sense of that which the news of my victory will give my father and my mother."

6. Among an incredible number of illustrious persons who were falsely accused and put to death by Nero, was one Barea Soranus; a man, as Tacitus informs us, of singular vigilance and justice in the discharge of his duty. During his confinement, his daughter Servilia was apprehended and brought into the senate, and there arraigned. The crime laid to her charge was, that she had turned into money all her ornaments and jewels, and the most valuable part of her dress, to defray the expence of consulting magicians. To this the young Servilia, with tears, replied, That she had indeed consulted magicians, but the whole of her inquiry was to know whether the emperor and senate would afford protection and safety to her dear

and indulgent parent against his accusers, "With this view (said she) I presented the diviners, men till now utterly unknown to me, with my jewels, apparel, and the other ornaments peculiar to my quality, as I would have presented my blood and life, could my blood and life have procured my father's liberty. But whatever this my proceeding was, my unfortunate father was an utter stranger to it; and if it is a crime, I alone am the delinquent." She was, however, together with her father, condemned to die: but in what manner, history is silent. [Vid. *Taciti Annales*, lib. 6. cap. 20.]

7. Valerius Maximus* likewise relates a very singular fact upon this subject. A woman of illustrious birth had been condemned to be strangled. The Roman prætor delivered her up to the triumvir, who caused her to be carried to prison, in order to her being put to death. The goaler, who was ordered to execute her, was struck with compassion, and could not resolve to kill her. He chose therefore to let her die of hunger. Besides which, he suffered her daughter to see her in prison; taking care, however, that she brought her nothing to eat. As this continued many days, he was surprised that the prisoner lived so long without eating; and suspecting the daughter, upon watching her, he discovered that she nourished her mother with her own milk. Amazed at so pious, and at the same time so ingenious an invention, he told the fact to the triumvir, and the triumvir to the prætor, who believed the thing merited relating in the assembly of the people. The criminal was pardoned, and a decree was passed that the mother and daughter should be subsisted for the rest of their lives at the expence of the public.

The same author gives a similar instance of filial piety in a young woman named Xantippe to her aged father Cimonus, who was likewise confined in prison, and which is universally known by the name of the *Roman Charity*. Both these instances appeared so very extraordinary and uncommon to that people, that they could only account for them, by supposing that the love of children to their parents was the first law of nature. *Putaret aliquis* (says our author) *hoc contra naturam factum esse, nisi prima natura lex esset diligere parentes.*

In addition to the foregoing examples, we may refer to the article *ETNA*, n° 51. par. 3. where a very noble instance of filial piety is taken notice of. See also the article *PIETAS*.

FILIBEG, or FILLBEG. See *PHILIBEG*.

FILICACIA (Vincent), a celebrated Italian poet, was born at Florence in 1642. He was a member of the Academy della Crusca and of that of the Arcadi, and became secretary to the duke of Tuscany. He died in 1707. His poems are much esteemed for the delicacy and nobleness of their sentiments. Scipio de Filicacia, his son, had them all printed together, under the title of *Poesie Fosiano di Vincenzo da Filicacia*, in 1707, 4to.

FILICES, (from *filum* "a thread," *quasi filatim incisa*), FERNS; one of the seven tribes or families of the vegetable kingdom, according to Linnæus, by whom it is thus characterized: "having their fructification on the back side of the frondes." They constitute the first order in the class cryptogamia; and consist of

Filial
I
Filices.* Lib. v. 4.
Plinii Hist.
lib. vii. 36.

Filices
|
Fillagree.

16 genera, which are divided into *fructificationes, spicatae, frondosae, & radicales*. This order comprehends the entire xvth class of Tournefort, in whose system the filices make only a single genus, in the first section of the abovementioned class.

FILICES, is also an order of plants in the *fragmenta methodi naturalis* of Linnæus. See BOTANY, p. 469. col. 2.

FILIGRANE, FILIGREE, or FILLAGREE, *Work*. See FILLAGREE.

FILING, one of the principal operations in smithery, &c. succeeding to forging. See FILE.

The coarser cut files are always to be succeeded by finer; and in all the kinds the rule is, to lean heavy on the file in thrusting it forward, because the teeth of the file are made to cut forwards. But in drawing the file back again for a second stroke, it is to be lightly lifted just above the work, by reason it cuts not coming back.

The rough or coarse-toothed file (which, when large, is called a *rubber*) serves to take off the unevennesses of the work left by the hammer in forging.

The bastard-toothed file is to take out too deep cuts, and file strokes made by the rough file. The fine-toothed file takes out the cuts or file-strokes the bastard file made; and the smooth file those left by the fine file.

In this order, the files of several cuts are to succeed each other till the work is as smooth as it can be filed. After which it may be made yet smoother with emery, tripoli, &c. See POLISHING.

FILIPENDULA, in botany. See SPIRÆA.

FILIX, in botany. See FILICES.

FILLAGREE, FILIGREE, or FILIGRANE, *work*, a kind of enrichment on gold or silver, wrought delicately, in manner of little threads or grains, or both intermixed. The word is compounded of *fil* or *filum* "thread," and *granum* "grain." In Latin it is called *filatim elaboratum opus, argentum, aurum*.

There is no manufacture in any part of the world, that has been more admired and celebrated, than the fine gold and silver fillagree of Sumatra. And what renders it a matter of greater curiosity is the coarseness of the tools employed in the workmanship, and which, in the hands of an European, would not be thought sufficiently perfect for the most ordinary purposes.—They are rudely and inartificially formed, by the goldsmith (*pandi*), from any old iron he can pick up.

When you engage one of them to execute a piece of work, his first request is usually for a piece of iron hoop, to make his wire-drawing instrument; an old hammer head, stuck in a block, serves for an anvil; and a pair of compasses is often composed of two old nails tied together at one end. The gold is melted in a piece of *precoo* or earthen rice-pot, or sometimes in a crucible of their own make, of ordinary clay. In general they use no bellows, but blow the fire with their mouths, through a joint of bamboo; and if the quantity of metal to be melted is considerable, three or four persons sit round their furnace, which is an old broken quallee or iron pot, and blow together. At Padang alone, where the manufacture is more considerable, they have adopted the Chinese bellows. Their method of drawing the wire differs but little from that

used by European workmen. When drawn to a sufficient fineness, they flatten it by beating it on their anvil; and when flattened, they give it a twist like that in the whalebone handle of a punch ladle, by rubbing it on a block of wood with a flat stick. After twisting they again beat it on the anvil, and by these means it becomes flat wire with indented edges. With a pair of nippers they fold down the end of the wire, and thus form a leaf, or element of a flower in their work, which is cut off. The end is again folded and cut off, till they have got a sufficient number of leaves, which are laid on singly. Patterns of the flowers or foliage, in which there is not very much variety, are prepared on paper, of the size of the gold plate on which the fillagree is to be laid. According to this, they begin to dispose on the plate the larger compartments of the foliage, for which they use plain flat wire of a larger size, and fill them up with the leaves before mentioned. To fix the work, they employ a glutinous substance, made of the red hot berry called *boca sago*, ground to a pulp on a rough stone. This pulp they placed on a young coconut about the size of a walnut, the top and bottom being cut off. After the leaves have been all placed in order, and stuck on, bit by bit, a solder is prepared of gold-filings and borax, moistened with water which they strew over the plate; and then putting it in the fire for a short time, the whole becomes united. This kind of work on a gold plate, they call *carrang papan*: when the work is open, they call it *carrang troufe*. In executing the latter, the foliage is laid out on a card, or soft kind of wood, and stuck on, as before described, with the sago berry; and the work, when finished, being strewed over with their solder, is put into the fire, when the card or soft wood burning away, the gold remains connected. If the piece be large, they solder it at several times. In the manufacture of badjoo buttons, they first make the lower part flat, and having a mould formed of a piece of buffalo's horn, indented to several sizes, each like one half a bullet mould, they lay their work over one of these holes, and with a horn punch they press it into the form of the button. After this they complete the upper part. When the fillagree is finished, they cleanse it, by boiling it in water with common salt and alum, or sometimes lime juice; and in order to give it that fine purple colour which they call *sapo*, they boil it in water with brimstone. The manner of making the little balls with which their works are sometimes ornamented, is as follows. They take a piece of charcoal, and having cut it flat and smooth, they make in it a small hole, which they fill with gold dust, and this melted in the fire becomes a little ball. They are very inexpert at finishing and polishing the plain parts, hinges, screws; and the like, being in this as much excelled by the European artists, as these fall short of them in the fineness and minuteness of the foliage. The Chinese also make fillagree mostly of silver, which looks elegant, but wants likewise the extraordinary delicacy of the Malay work. The price of the workmanship depends upon the difficulty or uncommonness of the pattern. In some articles of usual demand, it does not exceed one-third of the value of the gold; but in matters of fancy, it is generally equal to it.

FILLET, or FILET, in architecture, denotes a little

Fillagree,
Fillet.

Marsden's
Account of
Sumatra,
p. 141.

Fillet
||
Filter.

little square member or ornament used in divers places and on divers occasions, but generally as a corona over a greater moulding.

The fillet is the same with what the French call *reglet*, *bande*, and *bandelette*; the Italians *lista* or *listella*.

FILLET, in heraldry, a kind of orle or bordure, containing only a third or fourth part of the breadth of the common bordure. It is supposed to be withdrawn inwards, and is of a different colour from the field. It runs quite round, near the edge, as a lace over a cloak.

FILLET is also used for an ordinary drawn like the bar from the sinister point of the chief across the shield, in manner of a scarf; though it is sometimes also seen in the situation of a bend, fesse, cross, &c.

According to Guillim, the fillet is a fourth part of the chief, and is placed in the chief point of the escutcheon.

FILLET is also used among painters, gilders, &c. for a little rule or reglet of leaf-gold, drawn over certain mouldings; or on the edges of frames, pannels, &c. especially when painted white, by way of enrichment.

FILLETS, in the manege, are the loins of a horse, which begin at the place where the hinder part of the saddle rests.

FILLY, a term among horse-dealers, to denote the female or mare-colt.

FILM, a thin skin or pellicle. In plants, it is used for that thin, woody skin, which separates the seeds in the pods, and keeps them apart.

FILTER, or FILTRE, in chemistry, &c. a piece of woollen cloth, linen, paper, or other matter, some of which are in the form of hollow inverted cones, used to filtrate or strain liquors through. The filtre has the same use and effect with regard to liquids that the sieve or searce has in dry matter.

Filters are of two sorts. The first are simple pieces of paper or cloth, through which the liquor is passed without farther trouble. The second are twisted up like a skain or wick, and first wetted, then squeezed, and one end put in the vessel that contains the liquor to be filtrated; the other end is to be out, and hang down below the surface of the liquor; by means hereof the purest part of the liquor distills drop by drop out of the vessel, leaving the coarser part behind. This filter acts as a siphon.

FILTER is also a charm, supposed to have a virtue of inspiring love. The word is derived from *φιλεω*, *amo* 'I love.'

The Greeks, when their love was without success, had several arts to procure the affections of their beloved. The Thessalian women were famous for their skill in this as well as other magical practices. The means whereby it was effected were of divers sorts; it was sometimes done by potions called *φιλτρα*, which are frequently mentioned in authors of both languages. Juvenal speaks thus:

*Hic magicus affert cantus, hic Thessala vendit
Philtre, quibus valeant mentem vexare mariti.*

Their operations were violent and dangerous, and commonly deprived such as drank them of their reason. Plutarch and Cornelius Nepos report, that Lucullus the Roman general first lost his reason, and afterwards his life by one of them. Lucretius the poet ended his life by the same way; and Caius Caligula, as Suetonius reports, was driven into a fit of madness by a fil-

ter given him by his wife Cæsonia, which story is mentioned by the same poet. Ovid likewise assures us, that this was the usual effect of such potions.

The ingredients they were made of were of various sorts; several of which applied by themselves were thought effectual.

FILTRATION, the act of passing any liquor through a filter, called also *colature*, *percolation*, and *transcolation*. See FILTER, and CHEMISTRY, n° 568.

FIMBRIÆ, *Fringes*. The extremities or borders of the tubæ Fallopianæ were formerly thus called; the word signifying a *fringed border* which that part resembles.

FIMBRIATED, in heraldry, an ordinary with a narrow border or hem of another tincture.

FIN, in natural history, a well-known part of fishes, consisting of a membrane supported by rays, or little bony or cartilaginous ossicles.

The office of the fins has commonly been supposed to be analagous to that of feathers in fowls; and to assist the fish in its progressive motion, or swimming: but the later naturalists find this a mistake.

The tail is the great instrument of swimming: the fins only serve to keep the fish upright, and prevent vacillation or wavering. See ICHTHYOLOGY.

FINAL, in general, whatever terminates or concludes a thing; as *final judgment*, *final sentence*, &c.

FINAL Cause, is the end for which the thing is done. The final cause is the first thing in the intention of a person who does a thing; and the last in the execution. See CAUSE.

FINAL Letters among the Hebrew grammarians, five letters so called, because they have a different figure at the end of words from what they have in any other situation.

FINAL, in geography, a port-town of Italy, subject to Genoa, and situated on the Mediterranean, about 37 miles south-west of that city. It was sold to the Genoese in 1713, by the emperor Charles VI. E. Long. 9. 12. N. Lat. 44. 30.

FINANCES, in the French policy, denote the revenues of the king and state: much the same with the treasury or exchequer of the English, and the *fiscus* of the Romans.—The word is derived from the German *finantz*, "scraping, usury." Though Du Cange chooses rather to deduce it from the barbarous Latin *financia*, *præstatio pecuniaria*.

Council of the FINANCES, corresponds to the lords-commissioners of the treasury in Britain: the comptroller-general of the *finances*; to the lord high treasurer, &c.

The French have a peculiar kind of figures, or numeral character, which they call *chiffre de finance*.

FINCH-KIND, in ornithology, an appellation given to a genus of birds known among authors by the name of FRINGILLA. See that article.

Finch (Heneage), earl of Nottingham, the son of Sir Heneage Finch, some time recorder of London, and of a younger branch of the Winchelsea family, was born in 1621. By his good parts and diligence, he became a noted proficient in the municipal laws; was made solicitor-general by Charles II. on his restoration, and was very active in the prosecution of the regicides. In 1670, he was appointed attorney-general; about three years after, lord keeper of the great seal, on the removal of the earl of Shaftesbury; and lord chancellor in 1675. He was created earl of Nottingham

Filtration
||
Finch.

Fine.

tingham in 1681; and died the year following, being quite worn out by the fatigues of business. He published several speeches on the trials of the judges of king Charles I. with some few other things; and left behind him Chancery Reports in MS.

FINE, that which is pure and without mixture. The term is particularly used in speaking of gold or silver.

FINE, in law, hath divers applications. Sometimes it is used for a formal conveyance of lands or tenements, or of any thing inheritable, being *in esse temporis finis*, in order to cut off all controversies. Others define it to be a final agreement between persons, concerning any lands or rents, &c. of which any suit or writ is depending between them in any court.

FINE, sometimes signifies a sum of money paid for entering lands or tenements let by lease; and sometimes a pecuniary mulct for an offence committed against the king and his laws, or against the lord of the manor.

Blackst.
Comment.

FINES for Alienation, in feodal law. One of the attendants or consequences of tenure by vassalship. **KNIGHT-Service**, was that of fines due to the lord for every alienation, whenever the tenant had occasion to make over his land to another. This depended on the nature of the feodal connection; it not being reasonable nor allowed, that a feudatory should transfer his lord's gift to another, and substitute a new tenant to do the service in his own stead, without the consent of the lord: and, as the feodal obligation was considered as reciprocal, the lord also could not alienate his feignory without the consent of his tenant, which consent of his was called an *attornment*. This restraint upon the lord soon wore away: that upon the tenant continued longer. For, when every thing came in process of time to be bought and sold, the lords would not grant a licence to their tenants to aliene, without a fine being paid; apprehending that, if it was reasonable for the heir to pay a fine or relief on the renovation of his paternal estate, it was much more reasonable that a stranger should make the same acknowledgment on his admission to a newly purchased feud. In England, these fines seem only to have been exacted from the king's tenants *in capite*, who were never able to aliene without a licence: but as to common persons, they were at liberty, by *magna charta*, and the statute of *quia emptores* (if not earlier), to aliene the whole of their estate, to be holden of the same lord as they themselves held it of before. But the king's tenants *in capite*, not being included under the general words of these statutes, could not aliene without a licence: for if they did, it was in ancient strictness an absolute forfeiture of the land; though some have imagined otherwise. But this severity was mitigated by the statute 1 Edw. III. c. 12. which ordained, that in such case the lands should not be forfeited, but a reasonable fine be paid to the king. Upon which statute it was settled, that one-third of the yearly value should be paid for a licence of alienation; but, if the tenant presumed to aliene without a licence, a full year's value should be paid. These fines were at last totally taken away by statute 12 Car. II. c. 24. See **KNIGHT-Service**.

FINE-Drawing, or **Rentering**, a dexterous sewing
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up or rejoining the parts of any cloth, stuff, or the like, torn or rent in the dressing, wearing, &c.

It is prohibited to *fine draw* pieces of foreign manufacture upon those of our own, as has formerly been practised. See **RENTING**.

FINE-Still, in the distillery. That branch of the art which is employed on the distilling the spirit from treacle or other preparations or recrements of sugar, is called *fine-stilling*, by way of distinction from malt-stilling; and the person who exercises this part of the trade is called a *fine-stiller*.

The operation in procuring the spirit from sugar is the same with that used in making the malt-spirit; a wash of the saccharine matter being made with water from treacle, &c. and fermented with yeast. It is usual to add in this case, however, a considerable portion of malt, and sometimes powdered jalap, to the fermenting backs. The malt accelerates the fermentation, and makes the spirit come out the cheaper, and the jalap prevents the rise of any musty head on the surface of the fermenting liquor, so as to leave a greater opportunity for the free access of the air, and thus to shorten the work, by turning the foamy into a hissing fermentation.

FINERS of GOLD and SILVER, are those who purify and part those metals from other coarser ones by fire and acids. They are also called *parters* in old law-books, and sometimes *departers*.

FINERY, in the iron-works, is one of the two forges at which they hammer the sow or pig iron.

Into the finery they first put the pigs of iron, placing three or four of them together behind the fire, with a little of one end thrust into it; where, softening by degrees, they stir and work them with long bars of iron, and expose at different times different parts to the blast of the bellows, in order to refine it as equally as possible, till the metal runs together with a round mass or lump, which they call a *half bloom*.—They then take this out, and give it a few strokes with their sledges; afterwards they carry it to a great heavy hammer, raised by the motion of a water-wheel; where, applying it dexterously to the blows, they presently beat it out into a thick short square. This they put into the finery again, and heating it red-hot, they work it under the same hammer till it comes to be in the shape of a bar in the middle, but with two square knobs at the ends, which they call an *ancony*. It is then carried into the other forge called the *chaffry*.

FINEERING. See **VENEERING**.

FINESSE, a French term, of late current in English. Literally, it is of no farther import than our English *fineness*; but among us it is chiefly used to denote that peculiar delicacy or subtilty perceived in works of the mind, and the nicest and most secrete and sublime parts of any science or art.

It is sometimes used to express that kind of subtilty made use of for the purposes of deception.

FINGAL, king of Morven, in ancient Caledonia. He flourished in the third century; and according to the Irish histories died in the year 283, although there is some reason from Ossian's poems for placing his death a few years later. Fingal was descended in all probability from those Celtic tribes who were the first inhabitants of Britain. Tradition, and the poems of
H h Ossian,

Fine

||
Fingal.

Fingal.

Ossian, give him a long line of royal ancestors, such as Combat, Trenmor, Trathal, &c. who had all reigned over the same territory. Whether this territory was bounded by the Caledonian forest, or extended somewhat farther to the south, towards the Roman province, is uncertain; but there is no doubt of its having extended over all the north and west Highlands, comprehending the Hebrides, whose petty chiefs were all subject to the king of Morven. His principal place of residence was Selma, which was probably in the neighbourhood of Glenco, supposed to be the Cona of Ossian; though some imagine it to have been in Strath-Conan in Moray. The truth seems to be, that as Fingal and his people lived by hunting, they often shifted their habitation. Hence, in all parts of the Highlands we find, in the names of places, buildings, &c. such monuments as justify their several claims for the honour of Fingal's residence. Fingal acquired great fame by his prowess in arms. He made many successful incursions into the Roman province, from whence he carried away those spoils which his son so often mentions under the names of the *wine of the stranger*, and the *wax of the stranger*. By sea we find him frequently making voyages to Scandinavia, the Orkneys, and Ireland; called by Ossian, *Lochlin*, *Innisflore*, and *Ullin*. Several of these expeditions were celebrated by his son in epic poems, of which two only remain, *Fingal* and *Temora*. In the last of these poems, we find Fingal fighting together with his grandson Oscar. How long he lived afterwards is uncertain. He is said to have died a natural death; and therefore none of his son's poems relate to this event, though it is occasionally mentioned in many of them. "Did thy beauty last, O Ryno? Stood the strength of car-borne Oscar? Fingal himself passed away; and the halls of his fathers have forgot his steps. The blasts of the north opens thy gates, O king, and I behold thee sitting on mist, dimly gleaming in all thine arms. Thy form now is not the terror of the valiant: but like a watery cloud, when we see the stars behind it, with their weeping eyes. Thy shield is like the aged moon; thy sword vapour half kindled with fire. Dim and feeble is the chief who travelled in brightness before—But thy steps are on the winds of the desert, and the storms darken in thy hand. Thou takest the sun in thy wrath, and hidest him in thy clouds. The sons of little men are afraid, and a thousand showers descend."—*Berrathon*.

"The character of Fingal (Dr Blair observes) is perhaps the most perfect that was ever drawn by a poet, for we may boldly defy all the writers of antiquity to show us any hero equal to Fingal. Throughout the whole of Ossian's works, he is presented to us in all that variety of lights which give the full display of a character. In him concur almost all the qualities that can ennoble human nature; that can either make us admire the hero, or love the man. He is not only unconquerable in war, but he makes his people happy by his wisdom in the days of peace. He is truly the father of his people. He is known by the epithet of "Fingal of the mildest look," and distinguished on every occasion by humanity and generosity. He is merciful to his foes, full of affection to his children, full of concern about his friends, and never mentions Agandecca, his first love, without the utmost tender-

ness. He is the universal protector of the distressed; none ever went sad from Fingal.—"O Oscar! bend the strong in arms, but spare the feeble hand. Be thou a stream of many tides against the foes of thy people; but like the gale that moves the grass to those who ask thine aid: so Trenmor lived; such Trathal was; and such has Fingal been. My arm was the support of the injured; the weak rested behind the lightning of my steel. These were the maxims of true heroism, to which he formed his grandson. His fame is represented as every where spread; the greatest heroes acknowledge his superiority; his enemies tremble at his name; and the highest encomiums that can be bestowed on one whom the poet would most exalt is to say, That his soul was like the soul of Fingal. Wherever he appears, we behold the hero. The objects he pursues are always great; to bend the proud, to protect the injured, to defend his friends, to overcome his enemies by generosity more than by force. Some strokes of human imperfection and frailty are what usually give us the most clear view and the most sensible impression of a character, because they present to us a man such as we have seen; they recal known features of human nature. When poets go beyond this range, and attempt to describe a faultless hero, they, for the most part, set before us a sort of vague undistinguishable character, such as the imagination cannot lay hold of, or realise to itself as the object of affection. But Fingal, though exhibited without any of the common human failings, is nevertheless a real man; a character which touches and interests every reader."

We may observe, that Fingal appears to have been no less a poet than a warrior; at least in all those passages ascribed to him in the poems of his son, there is a grandeur and loftiness that elevates them above the common style even of Ossian. The following passage from the poem of *Carthou* may be taken as a specimen of Fingal's poetry, "Raise, ye bards," said the mighty Fingal, "the praise of unhappy Moina. Call her ghost with your songs, to our hills; that she may rest with the fair of Morven, the sunbeams of other days, and the delight of heroes of old. I have seen the walls of Balclutha, but they were desolate. The fire had resounded in the halls; and the voice of the people is heard no more. The stream of Clutha was removed from its place by the fall of the walls. The thistle shook, there, its lonely head: the moss whistled to the wind. The fox looked out from the windows; the rank grass of the wall waved round his head. Desolate is the dwelling of Moina: silence is in the house of her fathers. Raise the song of mourning, O bards, over the land of strangers. They have but fallen before us; for one day we must fall.—Why dost thou build the hall, son of the winged days? Thou lookest from thy towers to-day; yet a few years, and the blast of the desert comes; it howls in thy empty court, and whistles round thy half-worn shield.—And let the blast of the desert come! We shall be renowned in our day. The mark of my arm shall be in the battle, and my name in the song of bards. Raise the song; send round the shell: and let joy be heard in my hall. When thou, sun of heaven, shalt fail? if thou shalt fail, thou mighty light! if thy brightness is for a season, like Fingal; our fame shall survive thy beams."—Such was the

Fingal.

Fingers,
Fire.

the joy of Fingal in the day of his joy. His thousand bards leaned forward from their seats, to hear the voice of their king. It was like the music of the harp on the gale of the spring. Lovely were thy thoughts, O Fingal! Why had not Ossian the strength of thy soul? But thou standest alone, my father; and who can equal the king of Morven?"

FINGERS, in anatomy, the extreme part of the hand divided into five members. See ANATOMY, n° 56.

FINING of LIQUORS. See CLARIFICATION.

FINISTERRE, the most westerly cape or promontory of Spain, in 10. 15. W. Long. and 43° N. Lat. This cape is likewise the most westerly part of the continent of Europe.

FINITE, something bounded or limited, in contradistinction to INFINITE.

FINLAND (the duchy of), is bounded on the west by the gulph of Bothnia, on the east by Muscovy, on the south by the gulph of Finland and Ingria, and on the north by Bothnia and Lapland. It is about 200 miles in length, and almost as much in breadth. It contains many lakes; in which are several islands, which are generally rocks or inaccessible mountains. The inhabitants are small of stature, capable of enduring hardships, and good soldiers. The Russians have for some time rendered themselves masters of a good part of this province; the rest belongs to Sweden. It is divided into seven provinces: 1. Finland; 2. Cajana; 3. Thavasthia; 4. Nyeland; 5. Savolaxia; 6. Carelia; and, 7. Kexholmia.

Finland Proper is an agreeable country, and lies over-against the city of Stockholm, near the place where the gulphs of Bothnia and Finland meet. It is divided into South and North Finland. It is diversified with mountains, forests, lakes, meadows, and pleasant fields. The inhabitants salt the fish they do not consume themselves, and send it into foreign countries.

FINNINGIA, or FENNINGIA, (anc. geog.), the true reading for *Eningia* in Pliny, which he makes an island, but is more truly a peninsula. Now FINLAND, a province of Sweden. *Fenni*, or *Finni*, the people; whose ferocity was extraordinary, poverty extreme, herbs their food, skins their covering, and the ground their couch: regardless of man and of gods, they attained to a very difficult thing, not to have a single wish to form, (Tacitus).

FIR-TREE, in botany. See PINUS.

FIRE, in physiology, signifies that subtle invisible cause by which bodies are expanded or enlarged in bulk, and become hot to the touch; fluids are rarefied into vapour; solid bodies become fluid, and in like manner are at last dissipated, or if incapable of being carried off in vapour, are at length melted into glass. It seems likewise to be the chief agent in nature on which animal and vegetable life have an immediate dependence, and without which it does not appear that nature itself could subsist a single moment.

The disputes concerning fire, which for a long time divided philosophers, have now in a great measure, though not wholly, subsided. The celebrated philosophers of the last century, Bacon, Boyle, and Newton, were of opinion, that fire was no distinct substance from other bodies, but that it consisted entirely in the violent motion of the parts of any body. As no motion, however, can be produced without a cause, they were

obliged to have recourse to a mechanical force or impulse as the ultimate cause of fire in all cases. Thus Boyle tells us, that when a piece of iron becomes hot by hammering, "there is *nothing* to make it so, except the forcible motion of the hammer impressing a vehement and variously determined agitation on the small parts of the iron." Bacon defines *heat*, which he makes synonymous with fire, to be "an expansive undulatory motion in the minute particles of a body, whereby they tend with some rapidity from a centre towards a circumference, and at the same time a little upwards." Sir Isaac Newton said nothing positive upon the subject; but conjectured that gross bodies and light might be convertible into one another; and that great bodies of the size of our earth when violently heated, might continue and increase their heat by the mutual action and reaction of their parts.

But while the mechanical philosophers thus endeavoured to account for the phenomena of fire upon the same principles which they judged sufficient to explain those of the universe in general, the chemists as strenuously asserted that fire was a fluid of a certain kind distinct from all others, and universally present throughout the whole globe. Boerhaave particularly maintained this doctrine; and in support of it brought the following argument, that steel and flint would strike fire, and produce the very same degree of heat in Nova-Zembla, which they would do under the equator. Other arguments were drawn from the increased weight of metalline calces, which they supposed to proceed from the fixing of the element of fire in the substance whose weight was thus increased. By these experiments, Mr Boyle himself seems to have been staggered; as he published a treatise on the possibility of making fire and flame ponderable; though this was directly contrary to his own principles already quoted. For a long time, however, the matter was most violently disputed; and the mechanical philosophers, though their arguments were equally inconclusive with those of their adversaries, at last prevailed through the prejudice in favour of Sir Isaac Newton, who indeed had scarce taken any active part in the contest.

That the cause of fire cannot be any mechanical motion which we can impress, is very evident; because on mechanical principles an effect must always be proportionable to the cause. In the case of fire, however, the effect is beyond all calculation greater than the cause, supposing the latter to be only a mechanical percussion, as in the case of hammering iron till it be red hot. By a few strokes of an hammer, the particles of a piece of iron, we shall allow, may be set in a violent motion and thus produce fire. If, however, we direct the motion of these particles upon another body whose parts are at rest, and in some degree coherent, it is plain that the latter will resist and diminish the motion of the particles already moved, in proportion to their *vis inertiae*, as well as the cohesion of the parts of the second body, if indeed we can suppose the *vis inertiae* of matter to be different from the effect of gravitation, cohesion, or some other power acting upon it. By no argumentation whatever, then, can we show upon mechanical principles, why fire should have such a tendency to increase and multiply itself without end, as we see it has, even abstracting from all consideration of the necessity of air for continuing the action of fire.

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The action of the air in augmenting and continuing the power of fire, seems scarce at all to have been considered by those who first undertook an investigation of the subject. It evidently gave rise to the Hutchinsonian hypothesis, that fire, light, and air, were convertible into one another. This, however, is equally untenable with the mechanical hypothesis: for later discoveries have shown, that our atmosphere is composed of two distinct fluids, only one of which is fit for supporting flame; and if we should suppose this to be the only proper air, it is in like manner demonstrated, that this pure fluid is not homogeneous, but composed of a gravitating and non-gravitating substance; the latter of which only has the properties of fire: so that this element is still as invisible as ever; nor can it be shown by any experiment that *fire per se* has ever been changed into a palpable or gravitating substance.

The experiments which first seemed to bring this dispute to a decision were those of Dr Black, concerning what he called *latent heat*; on which some other names, such as *absolute heat*, *specific fire*, &c. have been bestowed, very little to the advancement of science in general. From these discoveries it appears, that fire may exist in bodies in such a manner as not to discover itself in any other way than by its action upon the minute parts of the body; but that suddenly this action may be changed in such a manner as no longer to be directed upon the particles of the body itself, but upon external objects: in which case we then perceive its action by our sense of feeling, or discover it by the thermometer, and call it *sensible heat*. This expression, it must be owned, is improper; and the use of the word *heat*, instead of *fire*, has produced some confusion, which it is not now easy to avoid in speaking on these subjects. By the word *heat*, we ought always to understand the effect of fire, or the fluid acting in a certain manner, rather than the mere element itself; which, it is certain, from the experiments just mentioned, may exist in substances actually cold to the touch.

From this discovery made by Dr Black, along with many others in electricity, and recorded at length in various articles of this work, it is now almost universally allowed, that fire is a distinct fluid capable of being transferred from one body to another. But when this was discovered, another question no less perplexing occurred, viz. what kind of a fluid it was; or whether it bears any analogy to those with which we are better acquainted? Here we find two fluids, viz. the solar light, and the electric matter, both of which occasionally act as fire, and which therefore seem likely to be all the same at bottom. By the vulgar, indeed, the matter has long ago been determined; and the rays of the sun as well as the electrical fluid have been promiscuously denominated *elementary fire*. Philosophers, indeed, have withheld their assent; though their reasons for so doing are by no means apparent. The most strange suppositions, however, have been made concerning the nature of both those fluids, and on the most slender grounds imaginable; or rather, on no grounds at all, they have been supposed to be phlogiston itself, or to contain a large proportion of it. Mr Scheele went so far in this way as to form an hypothesis, which he endeavoured to support by some

experiments, that fire is composed of dephlogisticated air and phlogiston. But it is now ascertained beyond all possibility of dispute, that the result of such a combination is not fire, but fixed air: so that we need not take any further notice of this hypothesis than just to observe, that it would have been altogether untenable, even though this discovery had not been made; because the dephlogisticated air itself is not a simple but a compound substance, as has already been observed; and that in all cases of combustion, the one part of the air is separated from the other.

It was long ago observed by Sir Isaac Newton, that heat was certainly conveyed by a medium more subtle than the common air; because two thermometers, one included in the vacuum of an air-pump, the other placed in the open air, at an equal distance from the fire, would grow equally hot in nearly the same time. The consequence of this, had he pursued the thought, was, that fire itself was equally present in all places, and as active where there was no terrestrial matter as where there was. New improvements in the air-pump have enabled succeeding philosophers to make more perfect vacuums, such as it has been supposed even the electric matter cannot pass through. It is not to be doubted, however, that, even there, the thermometer would be heated by a fire as well as in the open air. Fire, therefore, exists and acts where there is no other matter, and of consequence is a fluid *per se*, independent of every terrestrial substance, without being generated or compounded of any thing we are yet acquainted with. To determine the nature of the fluid, we have only to consider whether any other can be discovered which will pass through the perfect vacuum just mentioned, and act there as fire. Such a fluid we find in the solar light, which is well known to act even *in vacuo* as the most violent fire. The solar light will likewise act in the very same manner in the most intense cold; for M. de Saussure has found, that on the cold mountain top the sun-beams are equally, nay more powerful, than on the plain below. It appears, therefore, that the solar light will produce heat independent of any other substance whatever; that is, where no other body is present, at least as far as we can judge, except the light itself, and the body to be acted upon. We cannot therefore avoid concluding, that a certain modification of the light of the sun is the cause which produces heat, expansion, vapour, &c. and answers to the rest of the characters given in our definition of fire, and that independent of any other substance whatever.

Under the article ELECTRICITY, sect. vi. we have endeavoured to show that the electric matter is no other than the light of the sun absorbed by the earth, and thus becoming subject to new laws, and assuming many properties apparently different from what it has when it acts as light. Even in this case it manifests its identity with fire or light, viz. by producing a most intense heat where a large quantity of it passes through a small space. *In vacuo*, indeed, we cannot manage it in such a manner as to make the proof decisive. But though this must be counted a defect, it never can amount to any positive proof that electricity and fire are different. We see that in some cases they produce the very same effects; and if they do not so in all, we ought rather to account for the difference from the variation of circumstances, and our want of knowledge or abilities

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ties to make proper experiments, than to multiply elements without any necessity, when one is evidently capable of answering all the purposes of nature. At any rate, the experiments which have already been made, and the proofs adduced from the phenomena of nature, show such a strong affinity between the elements of fire, light, and electricity, that we may not only assert their identity upon the most probable grounds, but lay it down as a position against which no argument of any weight has an existence at present. For a further discussion of this subject, see CHEMISTRY, Part I. Sect. i. ELECTRICITY, Sect. vi. HEAT, FLAME, FLUIDITY, &c.

Wild FIRE, a kind of artificial or factitious fire, which burns even under water, and that with greater violence than out of it.

It is composed of sulphur, naphtha, pitch, gum, and bitumen; and is only extinguishable by vinegar mixed with sand and urine, or by raw hides.

Its motion or tendency is said to be contrary to that of natural fire, and always follows the direction in which it is thrown; whether it be downwards, sideways, or otherwise. The French call it *Greek fire*, or *feu Gregeois*, because first used by the Greeks, about the year 660; as is observed by the Jesuit Petavius, on the authority of Nicetas, Theophanes, Cedrenus, &c.

The inventor, according to the same Jesuit, was an engineer of Heliopolis, in Syria, named *Callinicus*, who first applied it in the sea-fight commanded by Constantine Pogonates against the Saracens, near Cyzicus, in the Hellespont; and with such effect, that he burnt the whole fleet therewith, wherein were 30,000 men. But others will have it of a much older date; and hold Marcus Gracchus the inventor: which opinion is supported by several passages both in the Greek and Roman writers, which shows it to have been anciently used by both these nations in their wars.

Constantine's successors used it on divers occasions with equal advantage as himself; and what is remarkable enough is, that they were so happy as to keep the secret of the composition to themselves, so that no other nation knew it in the year 960.

Hugh king of Burgundy, demanding ships of the emperor Leo, for the siege of Frefne, desired likewise the Greek fire.

F. Daniel gives us a good description of the Greek fire in his account of the siege of Damietta under St Louis. Every body, says that author, was astonished with the Greek fire, which the Turks then prepared; and the secret whereof is now lost. They threw it out of a kind of mortar; and sometimes shot it with an odd sort of cross-bow, which was strongly bent by means of a handle or winch, of much greater force than the mere arm. That thrown with the mortar sometimes appeared in the air of the size of a tun, with a long tail, and a noise like that of thunder. The French by degrees got the secret of extinguishing it; in which they succeeded several times.

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xviii. 117.

Machine for Preserving from FIRE. This machine consists of a pole, a rope, and a basket. The pole is of fir, or a common scaffold pole, of any convenient length from 36 to 46 feet; the diameter at bottom, or greatest end, about five inches; and at the top, or smallest end, about three inches. At three feet from the top is a mortise through the pole, and a pulley fixed

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to it of nearly the same diameter with the pole in that part. The rope is about three quarters of an inch diameter, and twice the length of the pole, with a spring hook at one end, to pass through the ring in the handle of the basket when used; it is put through the mortise over the pulley, and then drawn tight on each side to near the bottom of the pole, and made fast there till wanted. The basket should be of strong wicker-work, three feet and an half long, two feet and an half wide, rounded off at the corners, and four feet deep, rounding every way at the bottom. To the top of the basket is fixed a strong iron curve or handle with an eye or ring in the middle; and to one side of the basket, near the top, is fixed a small cord, or guide-rope, of about the length of the pole. When the pole is raised, and set against a house over the window from which any persons are to escape, the manner of using it is so plain and obvious, that it needs not be described. The most convenient distance from the house for the foot of the pole to stand, where practicable, is about 12 or 14 feet. If two strong iron straps, about three feet long, rivetted to a bar cross, and spreading about 14 inches at the foot, were fixed at the bottom of the pole, this would prevent its turning round or slipping on the pavement. And if a strong iron hoop, or ferule, rivetted (or welded), to a semicircular piece of iron spreading about 12 inches, and pointed at the ends, were fixed on at the top of the pole, it would prevent its sliding against the wall.

When these two last mentioned irons are fixed on, they give the pole all the steadiness of a ladder; and because it is not easy, except to persons who have been used to it, to raise and set upright a pole of 40 feet or more in length, it will be convenient to have two small poles or spars of about two inches diameter, fixed to the sides of the great pole at about two or three feet above the middle of it, by iron eyes rivetted to two plates, so as to turn every way; the lower end of these spars to reach within a foot of the bottom of the great pole, and to have ferules and short spikes to prevent sliding on the pavement, when used occasionally to support the great pole like a tripod. There should be two strong ash trundles let through the pole, one at four feet and one at five feet from the bottom, to stand out about eight inches on each side, and to serve as handles, or to twist the rope round in lowering a very heavy weight. If a block and pulley were fixed at about the middle of the rope, above the other pulley, and the other part of the rope made to run double, it would diminish any weight in the basket nearly one-half, and be very useful in drawing any person up, to the assistance of those in the chambers, or for removing any effects out of a chamber, which it might be dangerous to attempt by the stairs.

It has been proved, by repeated trials, that such a pole as we have been speaking of can be raised from the ground, and two or three persons taken out of the upper windows of an house, and set down safely in the street, in the space of 35 seconds, or a little more than half a minute. Sick and infirm persons, women, children, and many others, who cannot make use of a ladder, may be safely and easily brought down from any of the windows of an house on fire by this machine, and, by putting a short pole through the handles of the basket, may be removed to any distance without being taken out of the basket. The pole must always have the

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Machines for extinguishing FIRE. In the year 1734, the state of Sweden offered a premium of 20,000 crowns for the best method of stopping the progress of accidental fires; when one Mr Fuches, a German physician, made a preparation for that end, and the experiment was made on a house built on purpose, of dry fir, at Legard island. In the building were placed several tubs of tar and pitch, and a great quantity of chips, all which were set on fire; flames issuing through the top of the house, windows, &c. when he threw in one of the barrels containing the preparation, which immediately quenched the flames; a second barrel entirely cleared the smoke away; and the whole was executed to the satisfaction of the spectators, and to the no small satisfaction of the inventor, who was about to return home, when unexpectedly the flames broke out again, supposed to be occasioned by a small quantity of combustible matter being introduced and set on fire secretly by some malicious person. Upon this the wrong-headed mob fell upon Mr Fuches, and beat him most unmercifully, so that he narrowly escaped with his life. He soon after left the country, and never could be prevailed on (though strongly persuaded by some of the most eminent citizens) to return. It is said, another experiment of the same kind was tried in the year 1761 in Holland; but rendered abortive through the perverseness of the populace.

Attempts of a similar nature have met with a better reception in England. Of these the most successful was that of Mr Godfrey, whose contrivance is thus described by Mr Ambrose Godfrey, grandson to the inventor. "The machine to be employed consists of a small portion of gunpowder closely confined; which, when animated by fire, acts by its elastic force upon a proper medium, and not only divideth it into the minutest atoms, but disperseth it also in every direction, so as immediately to extinguish any fire within a certain distance. This medium is a liquor strongly impregnated with a preparation of antiphlogistic principles, which by their action upon burning materials extinguish the flames, and reduce them in general to the state of a black coal; and, by its opposite nature to fire, hinders the remaining sparks, notwithstanding the admission of the air, from kindling the flames afresh. By this means, the great point is obtained, in giving sufficient time for totally extinguishing any remains of fire.

"They who presume that water only will perform this will find themselves greatly mistaken, as the draught of air will certainly rekindle the neighbouring materials, which are very fit to receive a fresh flame, the fire not being extinguished by the quantity of water, but rather by the expansion and rarefaction of its particles. There are several sizes of these machines, from five to fifty pounds weight, in a portable and rather small compass, and may generally be carried to any place where a man can go himself.

"But though these machines will prevent great fires

by a timely application, they will not extinguish them after they had reached a frightful height, and several houses, perhaps near a whole street, are in flames. The floors must be standing, and access to the building safe, otherwise no person can be supposed to approach near enough to apply them in a proper manner. Every fire has its beginning for the most part in some apartment; and, as soon as discovered, the family, instead of losing all presence of mind, should immediately apply one or more of these machines, which will then fully answer the intention. The proper time of applying them, supposes that they are ready at hand. It will be in vain to think of fetching them from any considerable distance, as it will then be too late for them to perform any important service; except indeed being the probable means of saving some adjacent house, by extinguishing the flames as often as they break out, till the building first on fire is totally consumed, and, by falling into ruins, leaves the other in perfect safety."

On the 19th of May 1761, at noon, Mr Godfrey's experiment for extinguishing fire, was tried in an house erected for that purpose, near Mary-le-bon. Their royal highnesses the duke of York, prince William Henry, prince Henry Frederic, a great number of persons of rank and distinction, and many of the learned world gave their attendance on this singular occasion. The house, which is of brick, consists of three rooms one above another, a stair-case, chimney, lath-and-plaster ceilings, and a kind of wainscoting round the rooms, of rough deal. Exactly at 12 o'clock the ground room, and that up one pair of stairs, were set on fire, by lighting the faggots and shavings laid in there for that purpose: in about 15 minutes the wainscot of the under room was thought to be sufficiently in flames, and three of the machines were thrown in; which, by almost immediate and sudden explosions, instantaneously extinguished the flames, and the very smoke in that apartment in a few minutes totally disappeared. By this time, the firemen, &c. who had the care of throwing in the machines, gave an alarm that the stair case had taken fire, and that it was necessary directly to go to work upon the next room; which was accordingly done, and with the same effect. The experiment, however, hitherto did not universally satisfy: in the last instance especially it was thought to be too hastily put in execution; and the populace without-side the paling, who were supposed to amount to near 20,000, and whose curiosity, from the very nature of their situation, remained much dissatisfied, began to grow rather riotous, and talked of a second bottle conjuror. For the sake of the experiment, therefore, and to remove all manner of doubt, Mr Godfrey consented to a third experiment in the upper room, which was entirely of wood. The flames were now suffered to get to a considerable height, and even the window frames destroyed, before the machines were thrown in: which, however, answered exactly as the former had done; and, being quite in sight of the out-standers, met with universal approbation.

These machines of Mr Godfrey's, it is evident, would be of great use in extinguishing fires on shipboard; and might be considered as a no less necessary part of a ship's lading, than her stores or ammunition.

The hint of these machines is said to have been taken by Dr Godfrey from the invention of one Zachary Grey,

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Greyl, who exhibited machines similar to those of Dr Godfrey, before persons of the first rank, but without meeting with any encouragement. His machines were made of wood, and the liquor employed was only water and consequently inferior to Dr Godfrey's in its power of extinguishing fire. The latter is said to have mixed his water with a certain quantity of oil of vitriol, or with sal ammoniac. These machines, however, as already observed, are found to be only serviceable in the beginning of a fire. When the roof had fallen in, they had no effect.

Water-Engine for Extinguishing FIRE. See HYDRO-STATICS, n^o 33.

In using this machine we have the following improvement by Dr Hoffman, which promises to be of great efficacy. As soon as the engine is in readiness to work, stir into the water that immediately is to be discharged, seven or eight pounds of pearl-ashes in powder, and continue to add it in this manner as occasion requires; taking care that it be directed against the timber or wainscot, &c. just beginning to burn, and not wasted against the brickwork; or, where time will admit, dissolve any quantity of pearl-ashes in a copper with water, and as fast as it dissolves, which will be in a few minutes, mix a pail full with the water in the engine, pretty often; and whatever burning wood it is played upon, will be extinguished as if it was dipped in water, and will not burn afresh in the part extinguished.

Easy Method of Extinguishing FIRE in Chimneys. It is well known, that the inner parts of chimneys easily take fire; the foot that kindles therein emits a greater flame, according as the tunnel is more elevated, because the inferior air feeds the fire. If this air could therefore be suppressed, the fire would soon be extinguished. In order to this, some discharge a pistol into the chimney, which produces no effect: others lay under the chimney a copper full of water; but the vapours that rise from it, far from extinguishing the fire, seem to give it new force. Water thrown into the chimney at top is equally of no effect, because it comes down through the middle of the tunnel, and not along the sides. It would be more advisable to stop with dung the upper orifices of the tunnel, for quenching the fire. But the surest and readiest method is, to take a little gunpowder, and having humected it with spittle for binding it, to form it into small masses, and so throw it in the heart of the chimney. When it is burnt, and has produced a considerable vapour, a second, afterwards a third, are thrown, and so on, as much as is necessary. In a little time the fire is extinguished, and, as it were, choaked by this vapour; and cakes of inflamed soot are seen to fall from the tunnel, till at last not the least vestige of fire appears.

Securing Buildings against FIRE. Dr Hales proposes to check the progress of fires by covering the floors of the adjoining houses with earth. The proposal is founded on an experiment which he made with a fire-board half an inch thick, part of which he covered with an inch depth of damp garden mould, and then lighted a fire on the surface of the mould; though the fire was kept up by blowing, it was two hours before the board was burnt through, and the earth prevented it from flaming. The thicker the earth is laid on the floors, the better: however, Dr Hales apprehends that the depth of an inch will generally be sufficient; and

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he recommends to lay a deeper covering on the stairs, because the fire commonly ascends by them with the greatest velocity.

M. Hartley made several trials in the years 1775 and 1776, in order to evince the efficacy of a method which he had invented for restraining the spread of fire in buildings. For this purpose thin iron plates are well nailed to the tops of the joists, &c. the edges of the sides and ends being lapped over, folded together, and hammered close. Partitions, stairs, and floors, may be defended in the same manner; and plates applied to one side have been found sufficient. The plates are so thin as not to prevent the floor from being nailed on the joists, in the same manner as if this preventative were not used; they are kept from rust by being painted or varnished with oil and turpentine. The expence of this addition, when extending through a whole building is estimated at about 5 per cent. Mr Hartley has a patent for this invention, and parliament has voted a sum of money towards defraying the expence of his numerous experiments. The same preservative may also be applied to ships, furniture, &c.

Lord Mahon has also discovered and published a very simple and effectual method of securing every kind of building against all danger of fire. This method he has divided into three parts, viz. under-flooring, extra-lathing, and inter-securing.

The method of under-flooring is either single or double. In single under-flooring, a common strong lath of oak or fir, about one-fourth of an inch thick, should be nailed against each side of every joist, and of every main timber, supporting the floor which is to be secured. Other similar laths are then to be nailed along the whole length of the joists, with their ends butting against each other. The top of each of these laths or fillets ought to be at 1½ inch below the top of the joists or timbers against which they are nailed; and they will thus form a sort of small ledge on each side of all the joists. These fillets are to be well bedded in a rough plaster hereafter mentioned, when they are nailed on, so that there may be no interval between them and the joists; and the same plaster ought to be spread with a trowel upon the tops of all the fillets, and along the sides of that part of the joists which is between the top of the fillets and the upper edge of the joists. In order to fill up the intervals between the joists that support the floor, short pieces of common laths, whose length is equal to the width of these intervals, should be laid in the contrary direction to the joists, and close together in a row, so as to touch one another: their ends must rest upon the fillets, and they ought to be well bedded in the rough plaster, but are not to be fastened with nails. They must then be covered with one thick coat of the rough plaster, which is to be spread over them to the level of the tops of the joists: and in a day or two this plaster should be trowelled over close to the sides of the joists, without covering the tops of the joists with it.

In the method of double-flooring, the fillets and short pieces of laths are applied in the manner already described; but the coat of rough plaster ought to be little more than half as thick as that in the former method. Whilst this rough plaster is laid on, some more of the short pieces of laths abovementioned must be laid in the intervals between the joists upon the first coat,

Fire. coat, and be dipped deep in it. They should be laid as close as possible to each other, and in the same direction with the first layer of short laths. Over this second layer of short laths there must be spread another coat of rough plaster, which should be trowelled level with the tops of the joists without rising above them. The rough plaster may be made of coarse lime and hair; or, instead of hair, hay chopped to about three inches in length may be substituted with advantage. One measure of common rough sand, two measures of slacked lime, and three measures of chopped hay, will form in general a very good proportion, when sufficiently beat up together in the manner of common mortar. The hay should be put in after the two other ingredients are well beat up together with water. This plaster should be made stiff; and when the flooring boards are required to be laid down very soon, a fourth or fifth part of quicklime in powder, formed by dropping a small quantity of water on the limestone a little while before it is used, and well mixed with this rough plaster, will cause it to dry very fast. If any cracks appear in the rough plaster-work near the joists when it is thoroughly dry, they ought to be closed by washing them over with a brush wet with mortar-wash: this wash may be prepared by putting two measures of quicklime and one of common sand in a pail, and stirring the mixture with water till the water becomes of the consistence of a thin jelly.

Before the flooring boards are laid, a small quantity of very dry common sand should be strewed over the plaster-work, and struck smooth with an hollow rule, moved in the direction of the joists, so that it may lie rounding between each pair of joists. The plaster-work and sand should be perfectly dry before the boards are laid, for fear of the dry rot. The method of under-flooring may be successfully applied to a wooden stair-case; but no sand is to be laid upon the rough plaster-work. The method of extra-lathing may be applied to ceiling joists, to sloping roofs, and to wooden partitions.

The third method, which is that of inter-securing, is very similar to that of under-flooring; but no sand is afterwards to be laid upon it. Inter-securing is applicable to the same parts of a building as the method of extra-lathing, but it is seldom necessary.

Lord Mahon has made several experiments in order to demonstrate the efficacy of these methods. In most houses it is only necessary to secure the floors; and the extra-expence of under-flooring, including all materials, is only about nine pence per square yard, and with the use of quicklime a little more. The extra-expence of extra-lathing is no more than six pence per square yard for the timber side walls and partitions; but for the ceiling about nine pence per square yard. But in most houses no extra-lathing is necessary.

FIRE-Eater. We have a great number of mountebanks who have procured the attention and wonder of the public by eating of fire, walking on fire, washing their hands in melted lead, and the like tricks.

The most celebrated of these was the famous Richardson, much talked of abroad. His secret, as related in the *Journal des Sçavans*, of the year 1680, consisted in a pure spirit of sulphur, wherewith he rubbed his hands, and the parts that were to touch the fire;

which burning and cauterising the epidermis, hardened and enabled the skin to resist the fire.

Indeed, this is no new thing: Amb. Paré assures us he had tried it on himself; that after washing the hands in urine, and with unguentum aureum, one may safely wash them in melted lead.

He adds also that by washing his hands in the juice of onions, he could bear a hot shovel on them while it melted lead.

FIRE, in theology. See **HELL**.

We read of the sacred fire in the first temple of Jerusalem, which came down from heaven: it was kept with the utmost care, and they were forbidden to carry any strange fire into the temple. This fire is one of the five things which the Jews confess were wanting in the second temple.

The pagans had their sacred fires, which they kept in their temples with the most religious care, and which were never to be extinguished. Numa was the first who built a temple to Fire as a goddess, at Rome, and instituted an order of priestesses for the preservation of it. See **VESTALS**.

Fire was the supreme god of the Chaldeans; the Magi were worshippers of fire; and the Greeks and Armenians still keep up a ceremony called the *holy fire*, upon a persuasion that every Easter-day a miraculous fire descends from heaven into the holy sepulchre, and kindles all the lamps and candles there.

FIRE kindled spontaneously in the Human Body. See *Extraordinary Cases of BURNING*.

FIRE-Barrel. See **FIRE-Ship**, Note (B).

FIRE-Bavins. Ibid. Note (D).

FIRE-Arrow, in naval artillery, is a small iron dart furnished with springs and bars, together with a match impregnated with sulphur and powder, which is wound about its shaft. It is intended to fire the sails of the enemy, and is for this purpose discharged from a musketoon or swivel-gun. The match being kindled by the explosion, communicates the flame to the sail against which it is directed, where the arrow is fastened by means of its bars and springs. This weapon is peculiar to hot climates, particularly the West Indies, where the sails being extremely dry by reason of the great heats, they instantly take fire, and of course set fire to the masts and rigging, and lastly to the vessel itself.

FIRE-Ball, in artillery, a composition of meal-powder, sulphur, salt-petre, pitch, &c. about the bigness of a hand-grenade, coated over with flax, and primed with the slow composition of a fuze. This is to be thrown into the enemy's works in the night time, to discover where they are; or to fire houses, galleries, or blinds of the besiegers; but they are then armed with spikes or hooks of iron, that they may not roll off, but stick or hang where they are desired to have any effect. See **FIRE-BALLS**, and **Light-BALLS**.

Balls of FIRE, in meteorology, a kind of luminous bodies generally appearing at a great height above the earth, with a splendor surpassing that of the moon; and sometimes equalling her apparent size. They generally proceed in this hemisphere from north to south with vast velocity, frequently breaking into several smaller ones, sometimes vanishing with a report, sometimes not.

These luminous appearances no doubt constitute one part of the ancient prodigies, blazing stars or comets, which

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which last they sometimes resemble in being attended with a train; but frequently they appear with a round and well defined disk. The first of these of which we have any accurate account, was observed by Dr Halley and some other philosophers at different places, in the year 1719. From the slight observations they could take of its course among the stars, the perpendicular height of this body was computed at about 70 miles from the surface of the earth. The height of others has also been computed and found to be various; though in general it is supposed to be beyond the limits assigned to our atmosphere, or where it loses its refractive power. The most remarkable of these on record appeared on the 18th of August 1783, about nine o'clock in the evening. It was seen to the northward of Shetland, and took a southerly direction for an immense space, being observed as far as the southern provinces of France, and one account says that it was seen at Rome also. During its course it appears frequently to have changed its shape; sometimes appearing in the form of one ball, sometimes of two or more; sometimes with a train, sometimes without one. It passed over Edinburgh nearly in the zenith, and had then the appearance of a well defined round body, extremely luminous and of a greenish colour; the light which it diffused on the ground giving likewise a greenish cast to objects. After passing the zenith it was attended by a train of considerable length, which continually augmenting, at last obliterated the head entirely; so that it looked like a wedge, flying with the obtuse end foremost. The motion was not apparently swift, by reason of its great height; though in reality it must have moved with great rapidity on account of the vast space it travelled over in a short time. In other places its appearance was very different. At Greenwich we are told, that "two bright balls parallel to each other led the way, the diameter of which appeared to be about two feet; and were followed by an expulsion of eight others, not elliptical, seeming gradually to mutilate, for the last was small. Between each two balls a luminous serrated body extended, and at the last a blaze issued which terminated in a point. Minute particles dilated from the whole. The balls were tinted first by a pure bright light, then followed a tender yellow, mixed with azure, red, green, &c.; which, with a coalition of bolder tints and a reflection from the other balls, gave the most beautiful rotundity and variation of colours that the human eye could be charmed with. The sudden illumination of the atmosphere, and the form and singular transition of this bright luminary, tended much to make it awful: nevertheless the amazing vivid appearance of the different balls, and other rich connective parts not very easy to delineate, gave an effect equal to the rainbow in the full zenith of its glory."

Dr Blagden, in a paper on this subject in the 74th volume of the Philosophical Transactions, has not only given a particular account of this and other meteors of the kind, but added several conjectures relating to the probable causes of them. The first thing which occurred to philosophers on this subject was, that the meteors in question were burning bodies rising from the surface of the earth, and flying along the atmosphere with great rapidity. But this hypothesis was soon abandoned, on considering that there was no power known by which such bodies could either be

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raised to a sufficient height, or projected with the velocity of the meteors. The next hypothesis was, that they do not consist of one single body, but of a train of sulphureous vapours, extending a vast way through the atmosphere, and being kindled at one end, display the luminous appearances in question by the fire running from one end of the train to the other. To this hypothesis, which was invented by Dr Halley, Dr Blagden objects that no just explanation is given of the nature of the vapours themselves, the manner in which they are raised up, or in which they can be regularly arranged in straight lines of such vast extent; or how they can be supposed to burn in such rarefied air. "Indeed, (says he) it is very difficult to conceive how vapours could be prevented, in those regions where there is in a manner no pressure, from spreading out on all sides in consequence of their natural elasticity, and instantly losing that degree of density which seems necessary for inflammation. Besides, it is to be expected, that such trains would sometimes take fire in the middle, and thus present the phenomenon of two meteors at the same time, receding from one another in a direct line."

For these and other reasons this hypothesis of Dr Halley was abandoned, and another substituted in its place. This was, that the meteors we speak of are permanent solid bodies, not rising from the earth, but revolving round it in very eccentric orbits, and thus in their perigee moving with inconceivable rapidity. But the Doctor shows, that even on this supposition, the velocity of such bodies must scarce be one third of that with which fire-balls move, and which has been calculated at upwards of 1000 miles per minute. The hypothesis is likewise liable to a number of other objections which cannot be answered, particularly from the variations in their appearance; for it is impossible to show in what manner one solid and permanent body could assume the appearance of eight or ten, as was the case with the meteor of 1783; nor can it be shown why a body, which in passing over Edinburgh appeared with a disk evidently less than that of the sun, should in passing over Greenwich, assume the appearance of *two* bodies, each of which had a disk considerably larger than the apparent disk of that luminary. To obviate, in some measure, objections of this kind, it has been supposed that the revolving bodies are surrounded by a kind of electrical atmosphere by which they are rendered luminous; but (says the Doctor) I think, whoever carefully peruses the various accounts of fire-balls, and especially ours of the 18th of August, when it divided, will perceive that their phenomena do not correspond with the idea of a solid nucleus involved in a subtle fluid, any more than with the idea of another learned gentleman, that they become luminous by means of a contained fluid, which occasionally explodes through the thick solid outer shell."

Another hypothesis, which Dr Blagden has not mentioned, is, that the meteors in question are a kind of bodies which take fire as soon as they come within the atmosphere of the earth. But this cannot be supposed without implying a previous knowledge of these bodies, which it is altogether impossible we can have. The only opportunity we have of seeing them is when they are on fire. Before that time they are in an invisible and unknown state; and it is surely improper to argue

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1. On account of their prodigious velocity, which is not less than 1200 miles in a minute, and seems incompatible with any other substance we know besides the electric fluid. "This (says he) is perhaps the only case in which the course or direction of that fluid is rendered perceptible to our senses, in consequence of the large scale on which these meteors move."

2. Various electrical phenomena have been observed to attend them, such as lambent fires settling upon men, horses, &c. and sparks coming from them, "or the whole meteor itself (adds our author), it is said, has damaged ships, houses, &c. after the manner of lightning." This last circumstance, however, we can believe only of another kind of fire-balls, of which we shall afterwards treat, which keep at a small distance from the earth, or run along its surface; for the great meteors of which we now speak, flying at the distance of 50 or 60, or more miles from the surface of the earth cannot be less from their apparent size than a mile or a mile and an half in diameter. Such an immense body of electric matter descending on the earth, would by its explosion ruin a large tract of country; and there is no probability that when engendered in such a rare atmosphere it could break through the whole body of gross and dense air which lies between these regions and the earth, and which we know resists the passage of the electric fluid very strongly. Notwithstanding this there is no impossibility that the atmosphere may be electrified to a great degree by such a meteor passing over it; and thus electrical appearances may attend these bodies without any actual emission of their substance, as Dr Blagden supposes. "If there be really (says he) any hissing noise heard while the meteors are passing, it seems explicable on no other supposition than that of streams of electric matter issuing from them, and reaching the earth with a velocity equal to that of the meteor, namely, in two or three seconds. Accordingly, in one of our late meteors, the hissing was compared to that of electricity issuing from a conductor. The sparks flying off so perpetually from the body of fire-balls may possibly have

some connection with these streams. In the same manner the sound of explosions may perhaps be brought to us quicker than if it was propagated to us by the air alone. Should these ideas be well founded, the change of direction, which meteors seem at times to undergo, may possibly be influenced by the state of the surface of the earth over which they are passing, and to which the streams are supposed to reach. A similar cause may occasion the apparent explosion, the opening of more channels giving new vent and motion to the electric fluid. May not the deviation and explosion which appear to have taken place in the fire-ball of the 18th of August over Lincolnshire, have been determined by its approach towards the fens, and an attraction produced by that large body of moisture?"

The explosion mentioned by our author over Lincolnshire does not seem to have been the only one which happened during the course of this meteor. Several people heard reports after it had vanished; and these were sometimes single and sometimes double. At Edinburgh two reports were heard, the one immediately following the other, at the distance of six or seven minutes after the meteor had passed. These reports no doubt indicated a temporary dissolution of the body; but it is by no means probable that the dissolution could have taken place either on account of the state of the earth or atmosphere. We must consider that both earth and atmosphere are always full of electric fluid; and if there happens to be what is called a *deficiency* (A) in one of them, the other instantly supplies it. It is impossible, therefore, that either the earth or atmosphere could receive such an immense additional quantity in one part without a vent being provided for it somewhere else. In thunder storms we naturally conclude that a vast quantity of electrical matter is put in motion; but from the effects of lightning it appears that this quantity must be very trifling in comparison with what the meteor we now speak of contained. A violent flash of lightning has been known to perforate a looking-glass, and make only a hole about an inch diameter. Now we have no reason to suppose that the flash, tremendous as it might appear to our eyes, was any other than an electric spark of an inch in diameter. The meteor, on the other hand, appears not to have been less than a mile in diameter; so that the disproportion betwixt it and a single flash of lightning appears almost beyond calculation; and we may reasonably conclude that it could not have been equalled by 10,000 thunder storms. Had this amazing body of electric fire descended through the atmosphere and dissipated itself on the fens of Lincolnshire, it must have produced the most violent and unheard of effects, not only in that place, but probably throughout the whole island. Its dissipation must therefore have been in the higher regions, where there was ample space to receive it; and where its explosion, whatever concussion it might make among the ethereal matter itself, could not affect our earth or atmosphere in any remarkable

(A) A real deficiency can never happen with regard to the electric fluid in any substance whatever, as is shown at large under the article ELECTRICITY, as well as many others in this work. What seems a deficiency is only when the fluid has a tendency to circulate. In this case, as the motion must begin in one place and return from another, the place where it begins seems to be deficient, because the fluid is going away from it; while that from which it returns seems, for a similar reason, to have too much.

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markable degree. Its re-appearance was owing to the same tendency in the fluid to circulate which had originally produced it; and which probably was the violent earthquake in Calabria and the eruption in Iceland. See EARTHQUAKE, n° III.

3. Another argument adduced by Dr Blagden in favour of the electrical origin of fire-balls, is their connection with the aurora borealis, and the resemblance they bear to these phenomena, which are now almost universally allowed to be electrical. "Instances (says he) are recorded, where northern lights have been seen to join, and form luminous balls, darting about with great velocity, and even leaving a train behind them like the common fire-balls. This train I take to be nothing else but the rarefied air left in such an electrified state as to be luminous; and some streams of the northern lights are very much like it." The aurora borealis appears to occupy as high, if not a higher region above the surface of the earth, as may be judged from the very distant countries to which it has been visible at the same time: indeed the great accumulation of electric matter seems to lie beyond the verge of our atmosphere, as estimated by the cessation of twilight. Also with the northern lights a hissing noise is said to be heard in some very cold climates: Gmelin speaks of it in the most pointed terms, as frequent and very loud in the north-eastern parts of Siberia*; and other travellers have related similar facts."

* See Aurora
borealis.

4. Our author thinks that the strongest argument for the electrical origin of these meteors is the direction of their course, which is constantly either from the north or north-west quarter of the heavens, or towards it; or, as our author thinks, nearly in the direction of the magnetical meridian. Such a course, however, seems only to belong to the very large fire-balls of which we now speak; the smaller ones, called *Falling Stars*, being moved in all directions; "perhaps (says the Doctor), because they come further within the verge of our atmosphere, and are thereby exposed to the action of extraneous causes. That the smaller sort of meteors, such as shooting stars, are really lower down in the atmosphere, is rendered very probable by their swifter apparent motion; perhaps it is this very circumstance which occasions them to be smaller, the electric fluid being more divided in more resisting air. But as those masses of electric matter which move where there is scarce any resistance, so generally affect the direction of the magnetic meridian, the ideas which have been entertained of some analogy between these two obscure powers of nature seem not altogether without foundation. If the foregoing conjectures be just, distinct regions are allotted to the electrical phenomena of our atmosphere. Here below we have thunder and lightning, from the unequal distribution of the electric fluid among the clouds in the loftier regions, whither the clouds never reach, we have the various gradations of falling stars; till, beyond the limits of our corpuscular atmosphere, the fluid is put into motion in sufficient masses, to hold a determined course and exhibit the different appearances of what we call fire balls: and probable at a still greater elevation above the earth, the electricity accumulates in a lighter and less condensed form, to produce the wonderfully diversified streams and coruscations of the aurora borealis.

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The paper from whence these extracts are taken was written before Mr Morgan's account of the non-conducting power of a perfect vacuum made its appearance. An abstract of his arguments on this subject is given under the article ELECTRICITY, n° 130—137. and their insufficiency to prove the point intended, is shown under the same article, n° 277. Under that article, we have only mentioned the deficiency in Mr Morgan's argument, without adducing any positive proof to the contrary. Such a proof, however, is offered by the meteor in question, or by others of the same nature. Dr Halley, speaking of the fire-ball of 1719, the height of which he calculated at very little less than 70 miles, expresses his surprise that sound should be propagated through a medium near 300,000 times rarer than the common air, and the next thing to a perfect vacuum. Now it remains, and for ever will remain, to be proved, that Mr Morgan's most perfect vacuum, formed by boiling quicksilver in a tube ever so long, contains a medium more than 300,000 times rarer than the common atmosphere. From Mr Cavallo's experiments* it appears, that when air is only rarefied 1000 times, the electric light is excessively weak; so that there is not the least probability that in an aerial medium 300,000 times rarer than the present, if indeed such a medium can exist, there could be any light made visible in the ordinary experiments. We see, however, by the many examples of meteors which have occurred at prodigious heights in the atmosphere, that the electric light in such a rarefied atmosphere is not only visible, but acts as vigorously in every respect as if it were on the surface of the earth. This circumstance therefore affords a complete demonstration of the fallacy of Mr Morgan's argument, and a direct proof that the electric fluid pervades space as completely divested of air as the best artificial vacuum we can make; nay, where it is generally believed by mathematicians that the atmosphere has ceased altogether. His other arguments drawn *a priori* are still more inconclusive than that we have just mentioned. He tells us, that if a vacuum was a conductor, the whole quantity of electric matter contained in the earth and atmosphere would be perpetually flying off through the regions of infinite space as being surrounded by a boundless conductor. But even this does not follow, though we should suppose these regions to be an absolute vacuity; for we know that electricity does not fly to a conducting substance merely because it is a conductor, but because it opens a passage to some place whither it has a tendency to go though the conductor was not there. Now, on the present hypothesis, as the conductor would lead to no place to which the electric matter had any previous tendency, we cannot assign any reason why it should acquire a tendency to fly off merely on account of the neighbourhood of a conductor, even though boundless. His other objection (that on the supposition of a vacuum being capable of conducting electricity, the whole space in the universe would be filled with electric fluid) may be admitted in its fullest extent, without any detriment whatever to science: and indeed, if we allow the electric fluid to be only a modification of the light of the sun, as is rendered very probable under the article ELECTRICITY, sect. vi. as well as that of FIRE, and many others in various places of this

* See Elec-
tricity,
n° 142.

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work, we must own that the whole universe is filled with it. The meteors in question will be no other than discharges of electricity from one part of the celestial spaces to another, similar to the discharges between the positive and negative side of an electrified bottle, thus intimating, that a circulation has taken place in the fluid, which the meteor at once completes and puts an end to. See the article METEOROLOGY.

Besides these already just mentioned of such vast magnitude, there are others much smaller and nearer the surface of the earth, rolling upon it, or falling upon it, exploding with violence, as is the case with those which appear in the time of thunder, and frequently produce mischievous effects. One of these is mentioned by some authors as falling in a serene evening in the island of Jamaica; exploding as soon as it touched the surface of the ground, and making a considerable hole in it. Another is mentioned by Dr Priestley as rolling along the surface of the sea, then rising and striking the top-mast of a man of war, exploding, and damaging the ship. In like manner we hear of an electrified cloud at Java in the East Indies: whence, without any thunder-storm, there issued a vast number of fire-balls, which did incredible mischief. This last phenomenon points out to us the true origin of balls of this kind, viz. an excessive accumulation of electricity in one part, or a violent tendency to circulate, when at the same time the place where the motion begins is at so great a distance, or meets with other obstacles of such a nature, that it cannot easily get thither. Urged on, however, by the vehement pressure from behind, it is forced to leave its place; but being equally unable to displace the great quantity of the same fluid, which has no inclination to move the same way with itself, it is collected into balls, which run hither and thither, according as they meet with conductors capable of leading them into some part of the circle. This is even confirmed by an experiment related at the end of Dr Priestley's fifth volume on Air. He relates that a gentleman having charged with a very powerful machine, a jar, which had the wire supporting the knob of a considerable length, and passed through a glass-tube, a globe of fire was seen to issue out of it. This globe gradually ascended up the glass-tube till it came to the top of the knob, where it settled, turning swiftly on its axis, and appearing like a red-hot iron ball of three quarters of an inch diameter. On continuing to turn the machine, it gradually descended into the jar; which it had no sooner done, than there issued a most violent explosion and flash, the jar being discharged and broken at the same time. This experiment, however, is singular in its kind; for neither the gentleman who performed it, nor any other, has yet been able to repeat it. Single as it is, however, we may yet gather from it, that a fire-ball will be the consequence of a very violent electrification of any substance, provided at the same time that the air be in a very non-conducting state, so that the electricity may not evaporate into it as fast as it is collected; for this would produce only lucid streams and flashes, as in the common experiments with the Leyden phial: and it is probably an inattention to this circumstance which has hitherto prevented the repetition of the experiment abovementioned.

The case is the same in thunder-storms, where an excessive accumulation of electric matter always produces fire-balls, the most mischievous kind of lightning, as is explained under that article.

With regard to the uses which fire-balls serve in the system of nature, it is plain that they are the means of preserving the equilibrium in the electric fluid in the atmosphere, which would otherwise produce the most dreadful tempests. Under the article *AURORA Borealis*, it is shown why there must be a constant current of electric matter through the bowels of the earth from the equator to the poles, and from the poles to the equator through the atmosphere. The great meteors serve for keeping up the equilibrium in this great atmospheric current, while the smaller ones answer a like purpose in the general mass of electric matter dispersed over the face of the earth, and therefore are seen to move in all directions, as the equilibrium happens to require them in different parts. With regard to those which are observed in the lower regions of the earth, or rolling on the surface of the ground itself, they undoubtedly answer purposes of a similar kind in these lower regions; for as fire-balls in general are produced by a great excess of electricity in one place there must of course be an equal deficiency in another; and to restore the equilibrium, or, to speak more properly, to prevent a dangerous commotion from taking place throughout the whole mass of electric fluid, the fire ball break forth, and either puts a stop at once to the disturbance by an explosion, or by silent and invisible evaporation. From some accounts indeed it would seem that even the large celestial meteors detached part of their substance to accomplish this purpose; though, for the reasons already given, it would seem more probable that they operated by electrifying the atmosphere, or setting the fluid contained in it in motion, so as to produce small fire-balls of itself, rather than by detaching any part of their own bodies to such a distance. Dr Blagden, in the paper above quoted, gives an account of an appearance of this kind. It was described in a letter to Sir Joseph Banks from the Abbé Mann, director of the academy at Brussels. "It happened (says the Abbé) at Mariekercke, a small village on the coast, about half a mile west of Ostend. The curate of the village was sitting in the dusk of the evening with a friend, when a sudden light surprised them, and, immediately after a small ball of light-coloured flame came through a broken pane of glass, crossed the room where they were sitting, and fixed itself on the chink of a door opposite to the window where it entered, and there died gradually away. It appeared to be a kind of phosphoric light carried along by the current of air. The curate and his friend greatly surprised at what they saw, apprehended fire in the neighbourhood; but going out, found that the fire which had come in through the window had been detached from a large meteor in its passage."

FIRE-COCKS. Churchwardens in London and within the bills of mortality, are to fix fire-cocks at proper distances in streets, and keep a large engine and hand engine for extinguishing fire, under the penalty of stat. 5 Ann. c. 31.

On the breaking out of any fire in London or Westminster, the constables and beadle of parishes shall repair

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pair to the place with their staves, and assist in extinguishing it, and cause the people to work for that end, &c.

FIRE-Engine. See *STEAM Engine*.

FIRE-Flair, in ichthyology. See *RAJA*.

FIRE-Flies, a species of flies common in Guiana, of which there are two species. The largest is more than an inch in length, having a very large head connected with the body by a joint of a particular structure, with which at some times it makes a loud knock, particularly when laid on its back. The fly has two feelers or horns, two wings, and six legs. Under its belly is a circular patch, which, in the dark, shines like a candle; and on each side of the head near the eyes is a prominent, globular luminous body, in size about one-third larger than a mustard seed. Each of these bodies is like a living star, emitting a bright, and not small, light; since two or three or of these animals, put into a glass-vessel, afford light sufficient to read without difficulty, if placed close to the book. When the fly is dead, these bodies will afford considerable light, though it is less vivid than before; and if bruised, and rubbed over the hands or face, they become luminous in the dark, like a board smeared over with English phosphorus. They have a reddish-brown or chestnut colour; and live in rotten trees in the day, but are always abroad in the night. The other kind is not more than half as large as the former: their light proceeds from under their wings, and is seen only when they are elevated, like sparks of fire appearing or disappearing at every second. Of these the air is full in the night, tho' they are never seen in the day. They are common not only in the southern, but in the northern parts of America, during the summer.

FIRE-Lock, or *Fusil*, a small gun which fires with a flint. It is distinguished from an old musket, or match-lock, which was fired with a match. The fire-lock is now in common use in the European armies.

FIRE-Philosophers, or *Philosophi per ignem*, a fanatical sect of philosophers who appeared towards the close of the 16th century, and made a figure in almost all the countries of Europe. The distinguishing tenet from which they derived this appellation was, that the intimate essences of natural things were only to be known by the trying efforts of fire, directed in a chemical process. They were also called *Theosophists*, from their declaring against human reason as a dangerous and deceitful guide, and representing a divine and supernatural illumination as the only means of arriving at truth: they were likewise denominated *Paracelsists*, from the name of Paracelsus, the eminent physician and chemist, who was the chief ornament and leader of this extraordinary sect. It was patronised in England by Robert Flood or Fludd, who endeavoured to illustrate the philosophy of Paracelsus in a great number of treatises; in France, it was zealously propagated by Rivier; in Denmark, by Severinus; in Germany, by Kunrath, an eminent physician of Dresden; and in other countries by warm and successful votaries, who assumed a striking air of piety and devotion, and proposed to themselves no other end than the advancement of the divine glory, and the restoration of peace and concord in a divided church: accordingly they were joined by several persons eminent for their piety, and distinguished by their zeal for the advancement of

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true religion. One of the most celebrated of these was Daniel Hoffman, professor of divinity in the university of Helmstadt, who, availing himself of some unguarded passages in the writings of Luther, extravagantly maintained, that philosophy was the mortal enemy of religion; that truth was divisible into two branches, the philosophical and theological; and that what was true in philosophy was false in theology. Hoffman was afterwards obliged, by the interposition of Henry Julius, duke of Brunswick, to retract his invectives against philosophy, and to acknowledge in the most open manner the harmony and union of sound philosophy with true and genuine theology.

FIRE-Places are contrivances for communicating heat to rooms, and also for answering various purposes of art and manufacture. See *CHIMNEY*, *FURNACE*, and *STOVE*.

The late ingenious Dr Franklin, having recounted the inconveniences and advantages of fire-places in common use, proposes a new contrivance for this purpose, called the *Pennsylvania fire-place*. 1. This machine consists of a bottom-place or hearth-piece (see fig. 1.) with a rising moulding before for a fender, two perforated ears *F*, *G*, for receiving two screw-rods; a long air-hole *aa*, through which the outward air passes into an air-box; and three smoke-holes represented by dark squares in *BC*, thro' which the smoke descends and passes away; besides, double ledges for receiving between them the lower edges of the other plates. 2. A back plate without holes, and furnished with a pair of ledges to receive, 3. The two side-plates, each of which has a pair of ledges to receive the side-edges of the front plate, with a shoulder on which it rests; two pair of ledges to receive the side-edges of the two middle plates which form the air-box, and an oblong air-hole near the top, through which the air warmed in the box is discharged into the room, and a wing or bracket as *H*, and a small hole as *R*, for the axis of the register to turn in. See fig. 2. which represents one of these plates. 4. An air-box, composed of the two middle plates *D E* and *F G*, fig. 3. and 4. The first has five thin ledges or partitions cast on it, the edges of which are received into so many pair of ledges cast in the other: the tops of all the cavities formed by these thin deep ledges are also covered by a ledge of the same form and depth cast with them; so that when the plates are put together, and the joints luted, there is no communication between the air-box and the smoke. In the winding passages of this box, fresh air is warmed as it passes into the room. 5. A front-plate, which is arched on the under side, and ornamented with foliages, &c. 6. A top plate, with a pair of ears *M*, *N*, (fig. 5.) answerable to those in the bottom plate, and perforated for the same purpose. It has also a pair of ledges running round the under side to receive the top edges of the front, back, and side plates. The air-box does not reach up to the top-plate by 2½ inches.

All these plates are of cast iron; and when they are all in their proper places, they are bound firmly together by a pair of slender rods of wrought iron with screws, and the machine appears as in fig. 5. There are also two thin plates of wrought iron, viz. 7. The shutter, which is of such a length and breadth as to close well the opening of the fire-place, and serving to blow

Plate
CXCI

Fire.

blow up the fire, and to secure it in the night. It is raised or depressed by means of two brass knobs, and slides in a groove left between the foremost ledge of the side plates and the face of the front plate. 8. The register, which is placed between the back plate and air-box, and furnished with a key; so that it may be turned on its axis, and made to lie in any position between level and upright. The operation of this machine, and the method of fixing it, may be understood by observing the profile of the chimney and fire-places in fig. 6. *M* is the mantle-piece or breast of the chimney; *C* the funnel; *B* the false back, made of brick-work in the chimney, four inches or more from the true back, from the top of which a closing is to be made over to the breast of the chimney, that no air may pass into the chimney except that which goes under the false back, and up behind it; *E* the true back of the chimney; *T* the top of the fire-place; *F* the front of it; *A* the place where the fire is made; *D* the air-box; *K* the hole in the side plate, thro' which the warmed air is discharged out of the air-box into the room; *H* the hollow, formed by removing some bricks from the hearth under the bottom plate filled with fresh air, entering at the passage *I*, and ascending into the air-box through the air-hole in the bottom plate near *C*, the partition in the hollow, designed to keep the air and smoke apart; *P* the passage under the false back, and part of the hearth for the smoke; and the arrows in the figure show the course of the smoke. The fire being made at *A*, the flame and smoke will ascend, strike the top *T*, and give it a considerable heat; the smoke will turn over the air-box, and descend between it and the back plate to the holes near *C* in the bottom plate, heating in its passage all the plates of the machine: it will then proceed under and behind the false back, and rise into the chimney. The air of the room contiguous to the several plates, and warmed by them, becomes specifically lighter than the other air in the room, and is obliged to rise; but being prevented by the closure over the fire-place from going up the chimney, is forced out into the room, and rising by the mantle-piece to the ceiling, is again driven down gradually by the stream of newly warmed air that follows; and thus the whole room becomes in a little time equally warmed. The air also, warmed under the bottom plate and in the air-box, rises and comes out of the holes in the side plates, and thus warming and continually changing the air of the room. In the closing of the chimney a square opening for a trap-door should be left for the sweeper to go up: the door may be made of slate or tin, and so placed, that by turning up against the back

of the chimney when open, it closes the vacancy behind the false back, and shoots the soot that falls in sweeping out upon the hearth. It will also be convenient to have a small hole, about five or six inches square, cut near the ceiling thro' into the funnel, and provided with a shutter; by occasionally opening which, the heated air of the room and smoke of tobacco, &c. may be carried off without incommoding the company. For a farther account of the manner of using this fire-place, the advantages attending it, answers to objections, and directions, to the brick-layer in fixing it, the curious reader may consult Franklin's Letters and Papers on Philosophical Subjects, p. 284—318. edit. 1769.

FIRE-Pots, in the military art, small earthen pots, into which is put a charged grenade, and over that powder enough till the grenade is covered; then the pot is covered with a piece of parchment, and two pieces of match across lighted: this pot being thrown by a handle of matches where it is designed, it breaks and fires the powder, and burns all that is near it, and likewise fires the powder in the grenade, which ought to have no fuse, to the end its operations may be the quicker.

FIRE-Reeds. See the next article, Note (c.)

FIRE-Ship, an old vessel filled with combustible materials, and fitted with grappling irons to hook, and set fire to, the enemies ships in battle, &c.

As there is nothing particular in the construction of this ship, except the apparatus by which the fire is instantly conveyed from one part to another, and from thence to the enemy, it will be sufficient to describe the fire room, where these combustibles are enclosed, together with the instruments necessary to grapple the ship intended to be destroyed.

The fire-room is built between decks, and limited on the after part by a *bulk-head*, *L*, behind the main-mast, from which it extends quite forward, as represented in Plate CXCI. The train inclosed in this apartment is contained in a variety of wooden troughs, *D*, *G*, which intersect each other in different parts of the ship's length; being supported at proper distances by cross-pieces and stanchions. On each side of the ship are six or seven ports, *H*, about 18 inches broad and 15 inches high; and having their lids to open downward, contrary to the usual method.

Against every port is placed an iron chamber (*A*), which, at the time of firing the ship, blows out the port-lid, and opens a passage for the flame. Immediately under the main and fore-shrouds is fixed a wooden funnel *M*; whose lower end communicates with a fire-barrel (*B*), by which the flame passing thro' the

(A) The iron-chambers are 10 inches long and 3.5 in diameter. They are breeched against a piece of wood fixed across the ports, and let into another a little higher. When loaded, they are almost filled with corn-powder, and have a wooden tom-pion well driven into their muzzles. They are primed with a small piece of quick-match thrust through their vents into the powder, with a part of it hanging out. When the ports are blown open by means of the iron-chambers, the port-lids either fall downward, or are carried away by the explosion.

(B) The fire-barrels ought to be of cylindrical form, as most suitable to contain the reeds with which they are filled, and more convenient for stowing them between the troughs in the fire-room. Their inside chambers should not be less than 21 inches, and 30 inches is sufficient for their length. The bottom parts are first well stored with

Fire.
Falconer's
Marine
Dictionary.

the funnel is conducted to the shrouds. Between the funnels, which are likewise called *fire-trunks*, are two scuttles, or small holes in the upper deck, serving also to let out the flames. Both funnels must be stopped with plugs, and have sail-cloth or canvas nailed close over them, to prevent any accident happening from above to the combustibles laid below.

The ports, funnels, and scuttles, not only communicate the flames to the outside and upper works of the ship and her rigging; but likewise open a passage for the inward air, confined in the fire-room, which is thereby expanded so as to force impetuously through those out-lets, and prevent the blowing up of the decks, which must of necessity happen from such a sudden and violent rarefaction of the air as will then be produced.

On each side of the bulk-head behind is cut a hole *L*, of sufficient size to admit a trough of the same dimensions as the others. A leading trough, *L I*, whose foremost end communicates with another trough within the fire-room, is laid close to this opening, from whence it extends obliquely to a sally-port *I*, cut thro' the ship's side. The decks and troughs are well covered with melted rosin. At the time of the firing either of the leading troughs, the flame is immediately conveyed to the opposite side of the ship, whereby both sides burn together.

The spaces *N, O*, behind the fire-room, represent the cabins of the lieutenant and master, one of which is on the starboard, and the other on the larboard side. The captain's cabin, which is separated from these by a bulk-head, is exhibited also by *P*.

Four of the eight fire-barrels are placed under the

Fire.

four fire-trunks; and the other four between them, two on each side the fire-scuttles, where they are securely cleated to the deck. The longest reeds (*c*) are put into the fore and aft troughs, and tied down: the shortest reeds are laid in the troughs athwart, and tied down also. The bavins (*d*), dipped at one end, are tied fast to the troughs over the reeds, and the curtains are nailed up to the beams, in equal quantities, on each side of the fire-room.

The remainder of the reeds are placed in a position nearly upright at all the angles of every square in the fire-room, and there tied down. If any reeds are left, they are to be put round the fire-barrels, and other vacant places, and there tied fast.

Instructions to prime.

TAKE up all the reeds, one after another, and strow a little composition at the bottom of all the troughs under the reeds, and then tie them gently down again: next strow composition upon the upper part of the reeds throughout the fire-room; and upon the said composition lay double quick-match upon all the reeds, in all the troughs: the remainder of the composition strow all over the fire-room, and then lay your bavins loose.

Cast off all the covers of the fire-barrels, and hang the quick-match loose over their sides, and place leaders of quick-match from the reeds into the barrels, and from thence into the vent of the chambers, in such a manner as to be certain of their blowing open the ports, and setting fire to the barrels. Two troughs of communication from each door of the fire-room to the sally-ports, must be laid with a strong leader of quick-match,

with short double-dipped reeds placed upright; and the remaining vacancy is filled with fire-barrel composition well mixed and melted, and then poured over them. The composition used for this purpose is a mass of sulphur, pitch, tar, and tallow.

There are five holes, of three-fourths inch in diameter and three inches deep, formed in the top of the composition while it is yet warm; one being in the centre, and the other four at equal distances round the sides of the barrel. When the composition is cold and hard, the barrel is primed by filling those holes with fuse-composition, which is firmly driven into them, so as to leave a little vacancy at the top to admit a strand of quick-match twice doubled. The centre-hole contains two strands at their whole length, and every strand must be driven home with mealed powder. The loose ends of the quick-match being then laid within the barrel, the whole is covered with a dipped curtain, fastened on with a hoop that slips over the head of the barrel, to which it is nailed.

The barrels should be made very strong, not only to support the weight of the composition before firing, when they are moved or carried from place to place, but to keep them together whilst burning: for if the staves are too light and thin, so as to burn very soon, the remaining composition will tumble out and be dissipated, and the intention of the barrels, to carry the flame aloft, will accordingly be frustrated.

The curtain is a piece of coarse canvas, nearly a yard in breadth and length, thickened with melted composition, and covered with saw-dust on both sides.

(*c*) The reeds are made up in small bundles of about a foot in circumference, cut even at both ends, and tied together in two places. They are distinguished into two kinds, viz. the long and short; the former of which are four feet, and the latter two feet five inches in length. One part of them are singly dipped, *i. e.* at one end: the rest are dipped at both ends in a kettle of melted composition. After being immersed about seven or eight inches in this preparation, and then drained, they are sprinkled over with pulverised sulphur upon a tanned hide.

(*d*) The bavins are made of birch, heath, or other bush-wood, which is tough and readily kindled. They are usually two or three feet in length, and have all their bush-ends lying one way, the other ends being tied together with small cords. They are dipped in composition at the bush-ends, whose branches are afterwards confined by the hand, to prevent them from breaking off by moving about; and also to make them burn more fiercely. After being dipped in the same manner as the reeds, they also are sprinkled with sulphur.

Fire.

match, four or five times double: also a cross-piece to go from the sally-port, when the ship is fired, to the communication trough, laid with leaders of quick-match, that the fire may be communicated on both sides at once.

What quick-match is left place so that the fire may be communicated to all parts of the room at once, especially about the ports and fire-barrels, and see that the chambers are well and fresh primed. [N. B. The port-fire used for firing the ship, burns about 12 minutes. Great care must be taken to have no powder on board when the ship is fired.]

The sheer-hooks (represented by *A*) are fitted so as to fasten on the yard-arms of the fire-ship, where they hook the enemy's rigging. The fire-grapplings, (*B*.) are either fixed on the yard-arms, or thrown by hand, having a chain to confine the ships together, or fasten those instruments wherever necessary.

When the commanding officer of a fleet displays the signal to prepare for action, the fire-ships fix their sheer-hooks, and dispose their grapplings in readiness. The battle being begun, they proceed immediately to prime, and prepare their fire-works. When they are ready for grappling, they inform the admiral thereof by a particular signal.

To avoid being disabled by the enemy's cannon during a general engagement, the fire-ships continue sufficiently distant from their line of battle, either to windward or to leeward.

They cautiously shun the openings or intervals of the line, where they would be directly exposed to the enemy's fire, from which they are covered by lying on the opposite side of their own ships. They are attentively to observe the signals of the admiral or his seconds, in order to put their designs immediately in execution.

Although no ships of the line should be previously appointed to protect any fire-ship, except a few of the smallest particularly destined to this service, yet the ship before whom she passes in order to approach the enemy, should escort her thither, and assist her with an armed boat, or whatever succour may be necessary in her situation.

The captain of the fire-ship should himself be particularly attentive that the above instructions are punctually executed, and that the yards may be so braced when he falls along-side of the ship intended to be destroyed, that the sheer-hooks and grapplings fastened to the yard-arms, &c. may effectually hook the enemy. He is expected to be the last person who quits the vessel; and being furnished with every necessary assistance and support, his reputation will greatly depend on the success of his enterprise.

Lambent FIRES, as the shining of meat at certain seasons, the luminousness of the sea, of insects, vapours, &c. See the article *LIGHT*, *PHOLAS MEDUSA*, *NEREIS*, *FIRE-Flies*, *GLOW-Worm*, &c.

PORT-Fire. See *PORT-Fire*.

SPUR-Fire. See *SPUR-Fire*.

FIRE-Works, are preparations made of gun-powder, sulphur, and other inflammable and combustible ingredients, used on occasion of public rejoicings and other solemnities.

The invention of fire-works is by M. Mahudel attributed to the Florentines and people of Sienna; who

found out likewise the method of adding decorations to them of statues, with fire issuing from their eyes and mouths.

The art of preparing and managing these is called *pyrotechny*. See *PYROTECHNY*.

FIRING, in the military art, denotes the discharge of the fire-arms; and its object is to do the utmost execution to the enemy.

The present method of firing by platoons is said to have been invented by Gustavus Adolphus, and first used about the year 1618: the reason commonly given for this method is, that a constant fire may be always kept up. There are three different ways of platoon firing; viz. standing, advancing, and retreating. But previous to every kind of firing, each regiment or battalion must be told off in grand divisions, subdivisions, and platoons, exclusively of the grenadiers, which form two subdivisions or four platoons of themselves. In firing standing, either by divisions or platoons, the first fire is from the division or platoon on the right; the second fire from the left; the third from the right again; and so on alternately, till the firing comes to the centre platoon, which is generally called the *colour platoon*, and does not fire, remaining as a reserve for the colours. Firing advancing is performed in the same manner with this addition, that before either division or platoon fires, it advances three paces forward. Firing retreating varies from either of the former methods; for before either division or platoon fires, if they are marching from the enemy, it must go to the right about, and after firing, to the left about again, and continue the retreat as slow and orderly as possible.

In hedge-firing the men are drawn up two deep, and in that order both ranks are to fire standing. Oblique firing is either to the right and left, or from the right and left to the centre, according to the situation of the object. The Prussians have a particular contrivance for this purpose; if they are to level to the right, the rear ranks of every platoon make two quick but small paces to the left, and the body of each soldier turns one-eighth of a circle, and *vice versa*. Parapet firing depends on the nature of the parapet over which the men are to fire, and also upon that of the attack made to possess it. This method of firing is sometimes performed by single ranks stepping on the banquettes and firing; each man instantly handing his arms to the centre rank of the same file, and taking his back in the room of it; and the centre rank giving it to the rear to load, and forwarding the arms of the rear to the front rank; by which means the front rank men can fire six or seven rounds in a minute with exactness. Parapet firing may also be executed two deep, when the banquettes are three feet broad, or in field works, where not banquettes are made. Square firing is performed by a regiment or body of men drawn up in a hollow square, in which case each front is generally divided into four divisions or firings, and the flanks of the square, being the weakest part, are covered by four platoons of grenadiers. The first fire is from the right division of each face; the second from the left division of each face, &c. and the grenadiers make the last fire. Street-firing is practised in two ways; either by making the division or platoon that has fired to wheel by half-rank to the right and left

Firing.

Firkin
|
First-born.

left outwards from the centre, and to march in that order by half divisions down the flanks on each side of the column, and to draw up in the rear, and go on with their priming and loading; or, to make the division or platoon, after firing, to face to the right and left outwards from the centre, and one half rank to follow the other; and in that order to march in one centre file down on each side of the column into the rear, and there draw up as before.

FIRING-Iron, in farriery, an instrument not unlike the blade of a knife; which being made red-hot, is applied to a horse's hams, or other places standing in need of it, as in preternatural swellings, farcy, knots, &c. in order to discuss them.

FIRKIN, an English measure of capacity for things liquid, being the fourth part of a barrel: it contains eight gallons of ale, soap, or herrings, or nine gallons of beer.

FIRLOT, a dry measure used in Scotland. The oat-firLOT contains 21 $\frac{1}{4}$ pints of that country; the wheat-firLOT contains about 2211 cubical inches; and the barley-firLOT 21 standard pints. Hence it appears that the Scotch wheat-firLOT exceeds the English bushel by 33 cubical inches.

FIRMAMENT, in the ancient astronomy, the eighth heaven or sphere; being that wherein the fixed stars were supposed to be placed. It is called the *eighth*, with respect to the seven heavens or spheres of the planets which it surrounds.

It is supposed to have two motions; a diurnal motion, given it by the *primum mobile*, from east to west, about the poles of the ecliptic; and another opposite motion from west to east; which last it finishes, according to Tycho, in 25,412 years; according to Ptolemy, in 36,000; and according to Copernicus, in 258,000; in which time the fixed stars return to the same precise points wherein they were at the beginning. This period is commonly called Plato's year, or the great year.

In various places of Scripture, the word *firmament* is used for the middle region of the air. Many of the ancients allowed, with the moderns, that the firmament is a fluid matter; though they, who give it the denomination of *firmament*, must have taken it for a solid one.

FIRMAN, is a passport or permit granted by the Great Mogul to foreign vessels, to trade within the territories of his jurisdiction.

FIRMICUS MATERNUS (Julius), a famous writer, who composed in Latin, about the year 345, an excellent book in defence of Christianity, intitled *De errore profanarum religionum*, which is printed with the notes of John Wouwer. There are also attributed to him eight books of astronomy, printed by Aldus Manutius in 1501; but this last work appears to have been written by another Julius Firmicus, who lived at the same time.

FIRMNESS, denotes the consistence of a body, or that state wherein its sensible parts cohere in such a manner, that the motion of one part induces a motion in the rest.

FIRST-BORN. See **PRIMOGENITURE**, for the literal meaning of the term.

In Scripture it is also often used in a figurative sense for that which is first, most excellent, most distinguished

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in any thing. Thus it is said of Christ (Col. i. 5.), that he is "the first-born of every creature;" and in Revelations (i. 5.), he is called "the first begotten of the dead;" that is, according to the commentators, Begotten of the Father before any creature was produced; and the first who rose from the dead by his own power. "The first born of the poor," (Isa. xiv. 30.) signifies, The most miserable of all the poor; and in Job (xviii. 13), "The first-born of death;" that is, The most terrible of all deaths.

FIRST-Fruits (*primitiae*), among the Hebrews, were oblations of part of the fruits of the harvest, offered to God as an acknowledgment of his sovereign dominion. The first of these fruits was offered in the name of the whole nation, being either two loaves of bread, or a sheaf of barley which was threshed in the court of the temple. Every private person was obliged to bring his first-fruits to the temple; and these consisted of wheat, barley, grapes, figs, apricots, olives, and dates.

There was another sort of first-fruits which were paid to God. When bread was kneaded in a family, a portion of it was set apart, and given to the priest or Levite who dwelt in the place: if there was no priest or Levite there, it was cast into the oven, and consumed by the fire. These offerings made a considerable part of the revenues of the Hebrew priesthood.

First-fruits are frequently mentioned in ancient Christian writers as one part of the church revenue. One of the councils of Carthage enjoins, that they should consist only of grapes and corn; which shows that this was the practice of the African church.

FIRST-Fruits, in the church of England, are the profits of every spiritual benefice for the first year, according to the valuation thereof in the king's books.

FISC, **FISCUS**, in the civil law, the treasury of a prince or state; or that to which all things due to the public do fall. The word is derived from the Greek *φίσκος* "a great basket," used when they went to market—By the civil law, none but a sovereign prince has a right to have a fisc or public treasury.

At Rome, under the emperors, the term *ararium* was used for the revenues destined for support of the charges of the empire; and *fiscus* for those of the emperor's own family. The treasury, in effect, belonged to the people, and the fiscus to the prince. Hence the goods of condemned persons, if appropriated to the use of the public, were said *publicari*; if to the support of the emperor or prince, *confiscari*.

FISCAL, in the civil law, something relating to the pecuniary interest of the prince or people. The officers appointed for the management of the fisc, were called *procuratores fisci*; and *advocati fisci*; and among the cases enumerated in the constitutions of the empire where it was their business to plead, one is against those who have been condemned to pay a fine to the fisc on account of their litigiousness or frivolous appeals.

FISCUS. See **FISC**.

FISH, in natural history, an animal that lives in the waters as the natural place of its abode.

Fishes form the fourth class of animals in the Linnaean system. Their most general or popular division is into *fresh* and *salt* water ones. Some, however, are of opinion, that all fishes naturally inhabit the salt-waters, and that they have mounted up into rivers

K k

only

First-fruits
|
Fish.

Fish. only by accident. A few species only swim up into the rivers to deposit their spawn; but by far the greatest number keep in the sea, and would soon expire in fresh water. There are about 400 species of fishes (according to Linnæus) of which we know something: but the unknown ones are supposed to be many more; and as they are thought to lie in great depths of the sea remote from land, it is probable that many species will remain for ever unknown.

For the subdivisions, characters, and natural history of this class of animals, see the articles *ICHTHYOLOGY* and *ZOOLOGY*.

Blowing of FISH, is a practice similar to that of blowing flesh, poultry, and pigs, and adopted for the same deceitful purposes. The method of blowing fish, especially cod and whittings, is by placing the end of a quill or tobacco-pipe at the vent, and pricking a hole with a pin under the fin which is next the gill; thereby making the fish appear to the eye large and full, which when dressed will be flabby, and little else than skin and bones. But this imposition may be discovered by placing the finger and thumb on each side of the vent, and squeezing it hard; the wind may be perceived to go out, the skin will fall in, and the fish appear lank, and of little value.

Breeding of FISHES may be turned to great advantage; for, besides furnishing the table, obliging one's friends, and raising money, the land will be thereby greatly improved, so as to yield more this way than by any other employment whatever. See *FISH-Pond*, *infra*; and *BREEDING of FISH*.

Castration of FISH, is a method first practised by Mr Tull, in order to prevent the excessive increase of fish in some of his ponds, where the numbers did not permit any of them to grow to an advantageous size. But he afterwards found, that the castrated fish grew much larger than their usual size, were more fat, and always in season. This operation may be performed both on male and female fish; and the most eligible time for it is when the ovaries of the female have their ova in them, and when the vessels of the male, analogous to these, have their seminal matter in them; because, at this time, these vessels are more easily distinguished from the ureters, which convey the urine from the kidneys into the bladder, and are situated near the seminal vessels on each side of the spine; which, without sufficient attention, may be mistaken for the ovaries, especially when these last are empty. The time least proper for this operation, is just after they have spawned, because the fish are then too weak and languid to bear, with success, so severe an operation; however, with skill and care, it may be performed almost at any time. When a fish is to be castrated, it must be held in a wet cloth, with his belly upwards; then with a sharp penknife, having its point bent backwards, the operator cuts through the integuments of the rim of the belly, taking care not to wound any of the intestines. As soon as a small aperture is made, he carefully inserts a hooked pen-knife, and with this dilates the aperture from between the two fore-fins almost to the anus. He then, with two small blunt silver-hooks, five or six inches long, and of this form P, by the help of an assistant, holds open the belly of the fish; and, with a spoon or spatula, removes carefully the intestines from

one side. When these are removed, you see the ureter, a small vessel, nearly in the direction of the spine, and also the ovary, a larger vessel, lying before it, nearer the integuments of the belly. This last vessel is taken up with a hook of the same kind with those before mentioned, and, after detaching it from the side far enough for the purpose, divide transversely with a pair of sharp scissors, care being taken that the intestines are not wounded or injured. After one of the ovaries has been divided, the operator proceeds to divide the other in the same manner; and then the divided integuments of the belly are sewed with silk, the stitches being inserted at a small distance from one another. Mr Tull observes further, that the spawning time is very various; that trouts are full about Christmas; perch in February; pikes in March, and carp and tench in May; and that allowance must be made for climate and situation, with regard to the spawning of fish. When the fish are castrated, they are put into the water where they are intended to continue; and they take their chance in common with other fish, as though they were not castrated. With tolerable care, few die of the operation. *Phil. Transf.* vol. xlviii. Part 2. art. 106.

Although we could not properly avoid inserting the above detail, it is presumed that few will be pleased with the invention. The operation is peculiarly cruel, and the purpose of it only a detestable piece of Apician refinement.

Feeding of FISHES. When they are fed in large pools or ponds, either malt boiled, or fresh grains, is the best food; thus carps may be raised and fed like capons, and tenches will feed as well. The care of feeding them is best committed to a gardener or the butler, who should be always at hand. When fed in a stew, any sort of grain boiled, especially peas, and malt coarsely ground, are proper food; also the grains after brewing, while fresh and sweet; but one bushel of malt not brewed, will go as far as two of grains.

Stealing of FISH, by persons armed and disguised, is felony without benefit of clergy by 9 Geo. I. cap. 22. See *BLACK act*. And by 5 Geo. III. cap. 14. the penalty of transportation for seven years is inflicted on persons stealing or taking fish in any water, within a park, paddock, orchard, or yard; and on the receivers, aiders, and abettors; and a forfeiture of five pounds to the owner of the fishery is made payable by persons taking or destroying (or attempting so to do) any fish in any river or other water within any inclosed ground, being private property.

Preserving of FISH for Cabinets. Linnæus's method is, to expose them to the air; and when they acquire such a degree of putrefaction that the skin loses its cohesion to the body of the fish, it may be slid off almost like a glove: the two sides of this skin may then be dried upon paper like a plant, or one of the sides may be filled with plaster of Paris, to give the subject a due plumpness. *Amen, Acad. tom. iii.*

A fish may be prepared, after it has acquired this degree of putrefaction, by making a longitudinal incision on the belly, and carefully dissecting the fleshy parts from the skin, which are but slightly attached to it in consequence of the putrescency. The skin is then to be filled with cotton and the antiseptic powder

Fish. as directed for birds; and, lastly, to be sewed up where the incision was made. See *Methods of Preserving Birds*.

Gold-Fish. See CYPRINUS.

Gilding on Fish. In the posthumous papers of Mr Hooke, a method is described of gilding live craw-fish, carps, &c. without injuring the fish. The cement for this purpose is prepared, by putting some burgundy-pitch into a new earthen pot, and warming the vessel till it receives so much of the pitch as will stick round it; then strewing some finely-powdered amber over the pitch when growing cold, adding a mixture of three pounds of linseed oil and one of oil of turpentine, covering the vessel, and boiling them for an hour over a gentle fire, and grinding the mixture, as it is wanted, with so much pumice-stone in fine powder as will reduce it to the consistence of paint. The fish being wiped dry, the mixture is spread upon it; and the gold-leaf being then laid on, and gently pressed down, the fish may be immediately put into water again, without any danger of the gold coming off, for the matter quickly grows firm in water.

FISH, in a ship, a plank or piece of timber fastened to a ship's mast or yard, to strengthen it; which is done by nailing it on with iron spikes, and winding ropes hard about them.

FISHES, in heraldry; are the emblems of silence and watchfulness; and are borne either upright, imbowed, extended, endorsed respecting each other, surmounting one another, fretted, &c.

In blazoning fishes, those borne feeding, should be termed *devouring*; all fishes borne upright and having fins, should be blazoned *hauriant*; and those borne transverse the escutcheon, must be termed *naiant*.

FISH-Ponds, those made for the breeding or feeding of fish.

Fish ponds are no small improvement of watery and boggy lands, many of which are fit for no other use. In making of a pond, its head should be at the lowest part of the ground, that the trench of the flood-gate or sluice, having a good fall, may not be too long in emptying. The best way of making the head secure, is to drive in two three rows of stakes above six feet long, at about four feet distance from each other, the whole length of the pond-head, whereof the first row should be rammed at least about four feet deep. If the bottom is false, the foundation may be laid with quicklime: which slaking, will make it as hard as a stone. Some lay a layer of lime, and another of earth dug out of the pond among the piles and strakes, and when these are well covered; drive in others as they see occasion, ramming in the earth as before, till the pond-head be of the height designed.

The dam should be made sloping on each side, leaving a waste to carry off the over-abundance of water in times of floods or rains; and as to the depth of the pond, the deepest part need not exceed six feet, rising gradually in shoals towards the sides, for the fish to sun themselves, and lay their spawn. Gravelly and sandy bottoms, especially the latter, are best for breeding; and a fat soil with a white fat water, on the washings of hills, commons, streets, sinks, &c. is best for fattening all sorts of fish. For storing a pond, carp is to be preferred for its goodness, quick growth, and great increase, as breeding five or six times a-year. A pond

of an acre, if it be a feeding and not breeding one, will every year feed 200 carps of three years old, 300 of two years old, and 400 of a year old. Carps delight in ponds, that have marle or clay bottoms, with plenty of weeds and grass, where on they feed in the hot months.

Ponds should be drained every three or four years, and the fish sorted. In breeding ones, the smaller ones are to be taken out, to store other ponds with, leaving a good stock of females, at least eight or nine years old, as they never breed before that age. In feeding ponds, it is best to keep them pretty near of a size. See *BREEDING of Fish*.

FISHER (John), bishop of Rochester, was born at Beverly in Yorkshire, in the year 1459, and educated in the collegiate church of that place. In 1484, he removed to Michael-house in Cambridge, of which college he was elected master in the year 1495. Having applied himself to the study of divinity, he took orders; and, becoming eminent as a divine, attracted the notice of Margaret countess of Richmond, mother of Henry VII. who made him her chaplain and confessor. In 1501, he took the degree of doctor of divinity, and the same year was elected chancellor of the university. In the year following, he was appointed Lady Margaret's first divinity-professor; and, in 1504 consecrated bishop of Rochester; which small bishopric he would never resign, though he was offered both Ely and Lincoln. It is generally allowed, that the foundation of the two colleges of Christ-church and St John's in Cambrige, was entirely owing to bishop Fisher's persuasions, and influence with the countess of Richmond: he not only formed the design, but superintended the execution. On the promulgation of Martin Luther's doctrine, our bishop was the first to enter the lists against him. On this occasion he exerted all his influence, and is generally supposed to have written the famous book by which Henry VII. obtained the title of *Defender of the Faith*. Hitherto he continued in favour with the king; but in 1527, opposing his divorce, and denying his supremacy, the implacable Harry determined, and, finally effected, his destruction. In 1534, the parliament found him guilty of misprision of treason, for concealing certain prophetic speeches of a fanatical impostor, called the *Holy Maid of Kent*, relative to the king's death; and condemned him with five others, in loss of goods, and imprisonment during his majesty's pleasure; but he was released on paying 300 l. for the king's use.

King Henry being now married to Anne Boleyn, his obsequious parliament took an oath of allegiance proper for the occasion. This oath the bishop of Rochester steadily refused; alledging that his conscience could not be convinced that the king's first marriage was against the law of God. For refusing this oath of succession, he was attainted by the parliament of 1534; and committed to the Tower, where he was cruelly treated, and where he would probably have died a natural death, had not the pope created him a cardinal. The king, now positively determined on his destruction, sent Rich the solicitor-general, under a pretense of consulting the bishop on a case of conscience, but really with a design to draw him into a conversation concerning the supremacy. The honest old bishop spoke his mind without suspicion or reserve, and

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an indictment and conviction of high treason was the consequence. He was beheaded on Tower-hill, on the 22d of June 1535, in the 77th year of his age. Thus died this good old prelate; who, notwithstanding his inflexible enmity to the reformation, was undoubtedly a learned, pious, and honest man. He wrote several treatises against Luther, and other works, which were printed at Wurtzburg, in 1597, in one volume folio.

FISHERY, a place where great numbers of fish are caught.

The principal fisheries for salmon, herring, mackrel pilchards, &c. are along the coasts of Scotland, England, and Ireland; for cod on the banks of Newfoundland; for whales, about Greenland: and for pearls in the East and West Indies.

Free FISHERY, in law, or an exclusive right of fishing in a public river, is a royal franchise; and is considered as such in all countries where the feudal polity has prevailed: though the making such grants, and by that means appropriating, what it seems unnatural to restrain the use of running water, was prohibited for the future by king John's Great Charter; and the rivers that were fenced in his time were directed to be laid open, as well as the forests to be disforested. This opening was extended by the second and third charters of Henry III. to those also that were fenced under Richard I.; so that a franchise of free fishery ought now to be as old at least as the reign of Henry II. This differs from a *several of piscary*, because he that has a several fishery must also be the owner of the soil, which in a free fishery is not requisite. It differs also from a *common fishery*, in that the free fishery is an exclusive right, the common fishery is not so: and therefore, in a free fishery a man has a property in the fish before they are caught; in a common piscary, not till afterwards. Some indeed have considered a *free fishery* not as a royal franchise; but merely as a private grant of a liberty to fish in the *several fishery* of the granter. But the considering such right as originally a flower of the prerogative, till restrained by Magna Charta, and derived by royal grant (previous to the reign of Richard I.) to such as now claim it by prescription, may remove some difficulties in respect to this matter with which our law books are embarrassed.

FISHERY, denotes also the commerce of fish, more particularly the catching them for sale.

"Were we to enter into a very minute and particular consideration of fisheries, as at present established in Britain, this article would swell beyond its proper bounds; because, to do justice to a subject of such concernment to the British nation requires a very ample and distinct discussion. We shall, however, observe that since the Divine Providence hath so eminently stored the coasts of Great Britain and Ireland with the most valuable fish; and since fisheries, if successful, become permanent nurseries for breeding expert seamen; it is not only a duty we owe to the supreme Being, not to despise the wonderful plenty he hath afforded us, by neglecting to extend this branch of commerce to the utmost; but it is a duty we owe to our country, for its natural security, which depends upon the strength of our royal navy. No nation can have a navy where there is not a fund of business to breed and employ seamen without any expence to the public; and no trade is so well calculated for

training up these useful members of society as fisheries.

"The situation of the British coasts is the most advantageous in the world for catching fish: the Scottish islands, particularly those to the north and west, lie most commodious for carrying on the fishing trade to perfection: for no country in Europe can pretend to come up to Scotland in the abundance of the finest fish, with which its various creeks, bays, rivers, lakes, and coasts are replenished. Of these advantages the Scots seem indeed to have been abundantly sensible; and their traffic in herrings, the most valuable of all the fisheries, is noticed in history so early as the ninth century*. The frequent laws which were enacted in the reigns of James III. IV. and V. discover a steady determined zeal for the benefit of the native subjects, and the full restoration of the fisheries, which the Dutch had latterly found means to engross, and do honour to the memory of those patriots whom modern times affect to call barbarians.

"The expedition of James V. to the Hebrides and western part of the Highlands, and his assiduity in exploring and sounding the harbours, discovered a fixed resolution in that active prince, to civilize the inhabitants, to promote the valuable fisheries at their doors, and to introduce general industry. His death, at an early period, and the subsequent religious and civil commotions in the kingdom, frustrated those wise designs, and the western fisheries remained in their original state of neglect. At length, 1602, James VI. resumed the national purposes which had been thus chalked out by his grandfather. "Three towns, (says Dr Robertson) which might serve as a retreat for the industrious, and a nursery for arts and commerce, were appointed to be built in different parts of the Highlands; one in Cantire, another in Lochaber, and a third in the isle of Lewis; and in order to draw the inhabitants thither, all the privileges of the royal boroughs were to be conferred upon them. Finding it, however, to be no easy matter to inspire the inhabitants of those countries with the love of industry, a resolution was taken to plant among them colonies of people from the more industrious countries. The first experiment was made in the isle of Lewis; and as it was advantageously situated for the fishing trade (a source from which Scotland ought naturally to derive great wealth), the colony transported thither was drawn out by Fife, the inhabitants of which were well skilled in that branch of commerce. But before they had remained there long enough to manifest the good effects of this institution, the islanders, enraged at seeing their country occupied by these intruders, took arms, and surprising them in the night-time, murdered some of them, and compelled the rest to abandon the settlement. The king's attention being soon turned to other objects, particularly to his succession to the English crown, we hear no more of this salutary project."

"The Scottish fisheries were, however, resumed by Charles I. who "ordained an association of the three kingdoms, for a general fishing within the hail seas and coasts of his majesty's said kingdoms; and for the government of the said association, ordained, that there should be a standing committee chosen and nominated by his majesty and his successors from time

*Fishery.**See art. 4. *infra.**Black. Comment.*

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to time," &c. &c. Several persons of distinction embarked in the design, which the king honoured with his patronage, and encouraged by his bounty. He also ordered lent to be more strictly observed; prohibited the importation of fish taken by foreigners; and agreed to purchase from the company his naval stores and the fish for his fleets. Thus the scheme of establishing a fishery in the Hebrides began to assume a favourable aspect; but all the hopes of the adventurers were frustrated by the breaking out of the civil wars, and the very tragical death of their benefactor.

"In 1661, Charles II. duke of York, lord Clarendon, and other persons of rank or fortune, resumed the business of the fisheries with greater vigour than any of their predecessors. For this purpose the most salutary laws were enacted by the parliaments of England and Scotland; in virtue of which, all materials used in, or depending upon, the fisheries, were exempted from all duties, excises, or imposts whatever. In England, the company were authorised to set up a lottery, and to have a voluntary collection in all parish churches; houses of entertainment, as taverns, inns, ale-houses, were to take one or more barrels of herrings, at the stated price of 30 s. per barrel; also 2 s. 6 d. per barrel was to be paid to the stock of this company on all imported fish taken by foreigners. Some Dutch families were also invited or permitted, to settle at Stornaway: the herrings cured by the royal English company gave general satisfaction, and, as mentioned above, brought a high price for those days. Every circumstance attending this new establishment seemed to be the result of a judicious plan and thorough knowledge of the business, when the necessities of the king obliged him to withdraw his subscription or bounty; which gave such umbrage to the parties concerned, that they soon after dissolved.

"In 1677, a new royal company was established in England, at the head of which was the duke of York, the earl of Derby, &c. Besides all the privileges which former companies had enjoyed, the king granted this new company a perpetuity, with power to purchase lands; and also L. 20 to be paid them annually, out of the customs of the port of London, for every dogger or buss they should build and send out for seven years to come. A stock of L. 10,980 was immediately advanced, and afterwards L. 1600 more. This small capital was soon exhausted in purchasing and fitting out busses, with other incidental expences. The company made, however, a successful beginning; and one of their busses or doggers actually took and brought home 32,000 cod-fish; other vessels had also a favourable fishery. Such favourable beginnings might have excited fresh subscriptions, when an unforeseen event ruined the whole design beyond the possibility of recovery. Most of the busses had been built in Holland, and manned with Dutchmen; on which pretence the French, who were then at war with Holland, seized six out of seven vessels, with their cargoes and fishing-tackle; and the company being now in debt, sold, in 1680, the remaining stores, &c. A number of gentlemen and merchants raised a new subscription of L. 60,000, under the privileges and immunities of the former charter. This attempt also came to nothing, owing to the death of the king, and the troubles of the subsequent reign.

"Soon after the revolution this business was again re-

sumed, and upon a more extensive scale; the proposed capital being 300,000 l. of which 100,000 l. was to have been raised by the surviving patentees or their successors, and 200,000 l. by new subscribers. Copies of the letters patent, the constitution of the company, and terms of subscription, were lodged at sundry places in London and Westminster, for the perusal of the public, while the subscription was filling. It is probable, that king William's partiality to the Dutch fisheries, the succeeding war, or both of these circumstances, frustrated this new attempt; of which we have no further account in the annals of that reign or since.

"The Scottish parliament had also, during the three last reigns, passed sundry acts for erecting companies and promoting the fisheries; but the intestine commotions of that country, and the great exertions which were made for the Darien establishment, enfeebled all other attempts, whether collectively or by individuals, within that kingdom.

"In 1749, his late majesty having, at the opening of the parliament, warmly recommended the improvement of the fisheries, the house of commons appointed a committee to inquire into the state of the herring and white fisheries, and to consider of the most probable means of extending the same. All ranks of men were elevated with an idea of the boundless riches that would flow into the kingdom from this source. A subscription of 500,000 l. was immediately filled in the city, by a body of men who were incorporated for 21 years by the name of *The Society of the Free British Fishery*. Every encouragement was held out by government, both to the society and to individuals, who might embark in this national business. A bounty of 36 s. per ton was to be paid annually out of the customs, for 14 years, to the owners of all decked vessels or busses, from 20 to 80 tons burden, which should be built after the commencement of the act, for the use of, and fitted out and employed in, the said fisheries, whether by the society or any other persons. At the same time numerous pamphlets and newspaper-essays came forth; all pretending to elucidate the subject, and to convince the public with what facility the herring fisheries might be transferred from Dutch to British hands. This proved, however, a more arduous task than had been foreseen by superficial speculators. The Dutch were frugal in their expenditures and living; perfect master of the arts of fishing and curing, which they had carried to the greatest height and perfection. They were in full possession of the European markets; and their fish, whether deserving or otherwise, had the reputation of superior qualities to all others taken in British seas. With such advantages, the Dutch not only maintained their ground against this formidable company, but had also the pleasure of seeing the capital gradually sinking, without having procured an adequate return to the adventurers; notwithstanding various aids and efforts of government from time to time in their favour, particularly in 1757, when an advance of 20 s. per ton was added to the bounty.

"In 1786 the public attention was again called to the state of the British fisheries, by the suggestions of Mr Destemper in the house of commons, and by different publications that appeared upon the subject: in consequence of which, the minister suffered a committee to be named, to inquire into this great source of national wealth. To that

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that committee it appeared, that the best way of improving the fisheries was to encourage the inhabitants living nearest to the seat of them to become fishers: And it being found that the north-western coast of the kingdom, though abounding with fish and with fine harbours, was utterly destitute of towns, and act was passed for incorporating certain persons therein named, by the style of "*The British Society for extending of the fisheries and improving the sea-coasts of this kingdom;*" and to enable them to subscribe a joint stock, and therewith to purchase lands, and built thereon free towns, villages, and fishing stations in the Highlands and islands in that part of Great Britain called Scotland, and for other purposes. The Isle of Mull, Loch-Broom, the Isle of Sky and of Cannay, have already been pitched upon as proper situations for some of these towns. The progress of such an undertaking from its nature must be slow, but still slower when carried on with a limited capital arising from the subscriptions of a few public-spirited individuals. But it is not to be doubted but that it will ultimately tend to the increase of the fisheries, and to the improvement of the Highland part of that kingdom. Its tendency is also to lessen the emigration of a brave and industrious race of inhabitants, many of whom have already removed with their families to America."

1. *Anchovy-FISHERY.* The anchovy is caught in the months of May, June, and July, on the coasts of Catalonia, Provence, &c. at which season it constantly repairs up the straits of Gibraltar, into the Mediterranean. Collins says they are also found in plenty on the western coasts of England and Wales.

The fishing for them is chiefly in the night-time; when a light being put on the stern of their little fishing-vessels, the anchovies flock round, and are caught in the nets. But then it is asserted to have been found by experience, that anchovies taken thus by fire, are neither so good, so firm, nor so proper for keeping, as those which are taken without fire.

When the fishery is over, they cut off the heads, take out their gall and guts, and then lay them in barrels, and salt them. The common way of eating anchovies is with oil, vinegar, &c. in order to which they are first boned, and the tails, fins, &c. slipped off.—Being put on the fire, they dissolve almost in any liquor. Or they are made into sauce by mincing them with pepper, &c. Some also pickle anchovies in small delft or earthen pots, made on purpose, of two or three pound weight, more or less, which they cover with plaster to keep them the better. Anchovies should be chosen small, fresh pickled, white on the outside and red within. They must have a round back; for those which are flat or large are often nothing but sardines. Beside these qualities, the pickle, on opening the pots or barrels, must be of a good taste, and not have lost its flavour.

2. *Cod FISHERY.* There are two kinds of cod-fish; the one green or white cod, and the other dried or cured cod; though it is all the same fish*, differently prepared; the former being sometimes salted and barrelled, then taken out for use; and the latter, having lain some competent time in salt, dried in the sun or smoke. We shall therefore speak of each of these apart; and first of the

Green. The chief fisheries for green cod are in

the bay of Canada, on the great bank of Newfoundland, and on the isle of St Peter, and the isle of Sable; to which places vessels resort from divers parts both of Europe and America. They are from 100 to 150 tons burden, and will catch between 30,000 and 40,000 cod each. The most essential part of the fishery is, to have a master who knows how to cut up the cod, one who is skilled to take off the head properly, and above all a good salter, on which the preserving of them, and consequently the success of the voyage, depends. The best season is from the beginning of February to the end of April: the fish, which in the winter retire to the deepest water, coming then on the banks, and fattening extremely. What is caught from March to June keeps well; but those taken in July, August, and September, when it is warm on the banks, are apt to spoil soon. Every fisher takes but one at a time: the most expert will take from 350 to 400 in a day; but that is the most, the weight of the fish and the great coldness on the bank fatiguing very much. As soon as the cod are caught, the head is taken off; they are opened, gutted, and salted; and the salter flows them in the bottom of the hold, head to tail, in beds a fathom or two square; laying layers of salt and fish alternately, but never mixing fish caught on different days. When they have lain thus three or four days to drain of the water, they are replaced in another part of ship, and salted again; where they remain till the vessel is loaded. Sometimes they are cut in thick pieces, and put in barrels for the convenience of carriage.

Dry. The principal fishery for this article, is from Cape Rose to the Bay des Exports, along the coast of Placentia, in which compass there are divers commodious ports for the fish to be dried in. These, though of the same kind with the fresh cod, are much smaller, and therefore fitted to keep, as the salt penetrates more easily into them. The fishery of both is much alike; only this latter is most expensive, as it takes up more time, and employs more hands, and yet scarce half so much salt is spent in this as in the other. The bait is herrings, of which great quantities are taken on the coast of Placentia. When several vessels meet and intend to fish in the same port, he whose ship first touches ground, becomes intitled to the quality and privileges of admiral: he has the choice of his station, and the refusal of all the wood on the coast at his arrival. As fast as the masters arrive, they unrig all their vessels, leaving nothing but the shrouds to sustain the mast; and in the mean time the mates provide a tent on shore, covered with branches of trees, and sails over them, with a scaffold of great trunks of pines, 12, 15, 16, and often 20 feet high, commonly from 40 to 60 feet long, and about one-third as much in breadth. While the scaffold is preparing, the crew are a-fishing; and as fast as they catch, they bring their fish ashore, and open and salt them upon moveable benches; but the main salting is performed on the scaffold. When the fish have taken salt, they wash and hang them to drain on rails; when drained, they are laid on kinds of stages, which are small pieces of wood laid across, and covered with branches of trees, having the leaves stripped off for the passage of the air. On these stages, there are disposed, a fish thick, head against tail, with the back uppermost, and are turned carefully

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four

* See *Gadus*.

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four times every 24 hours. When they begin to dry, they are laid in heaps 10 or 12 thick, in order to retain their warmth; and every day the heaps are enlarged, till they become double their first bulk; then two heaps are joined together, which they turn every day as before: lastly, they are salted again, beginning with those first salted; and being laid in huge piles, they remain in that situation till they are carried on board the ships, where they are laid on the branches of trees disposed for that purpose, upon the ballast, and round the ship, with mats to prevent their contracting any moisture.

There are four kinds of commodities drawn from cod, viz. the zounds, the tongues, the roes, and the oil extracted from the liver. The first is salted at the fishery, together with the fish, and put in barrels from 600 to 700 pound. The tongues are done in like manner, and brought in barrels from 400 to 500 pounds. The roes are also salted in barrels, and serve to cast into the sea to draw fish together, and particularly pilchards. The oil comes in barrels, from 400 to 520 pounds, and is used in dressing leather. In Scotland, they catch a small kind of cod on the coasts of Buchan, and all along the Murray frith on both sides; as also in the frith of Forth, Clyde, &c. which is much esteemed. They salt and dry them in the sun upon rocks, and sometimes in the chimney.

3. *Coral-FISHERY.* See CORAL.

* See the article *Gloucester*.

4. *Herring-FISHERY.* The great stations for this fishery are off the Shetland and Western Isles, and off the coast of Norfolk, in which the Dutch also share*. There are two seasons for fishing herring: the first from June to the end of August; and the second in Autumn, when the fogs become very favourable for this kind of fishing. The Dutch begin their herring-fishing on the 24th of June, and employ a vast number of vessels therein; called *busses*, being between 45 and 60 tons burden each, and carrying three or four small cannon. They never stir out of port without a convoy, unless there be enough together to make about 18 or 20 cannon among them, in which case they are allowed to go in company. Before they go out, they make a verbal agreement, which has the same force as if it were in writing. The regulations of the admiralty of Holland are partly followed by the French and other nations, and partly improved and augmented with new ones; as, that no fisher shall cast his net within 100 fathoms of another boat: that while the nets are cast, a light shall be kept on the hind-part of the vessel, that when a boat is by any accident obliged to leave off fishing, the light shall be cast into the sea: that when the greater part of a fleet leaves off fishing, and casts anchor, the rest shall do the same, &c.

† *Hist. of Commerce.*

Mr Anderson † gives to the Scots a knowledge of great antiquity in the herring-fishery. He says that the Netherlanders resorted to these coasts as early as A. D. 836, to purchase salted fish of the natives; but, imposing on the strangers, they learned the art, and took up the trade, in after-times of such immense emolument to the Dutch.

Sir Walter Raleigh's observations on that head, extracted from the same author, are extremely worthy the attention of the curious, and excite reflections on the vast strength resulting from the wisdom of well applied industry.

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In 1603, he remarks the Dutch sold to different nations, as many herrings as amounted to L. 1,759,000 Sterling. In the year 1615, they at once sent out 2000 busses, and employed in them 37,000 fishermen. In the year 1618, they sent out 3000 ships, with 50,000 men to take the herrings, and 9000 more ships to transport and sell the fish; which by sea and land employed 150,000 men, besides those first mentioned. All this wealth was gotten on the Scots coasts; while their attention was taken up in a distant whale-fishery.

The Scottish monarchs for a long time seemed to direct all their attention to the preservation of the salmon fishery; probably because their subjects were such novices in sea-affairs. At length James III. endeavoured to stimulate his great men to these patriotic undertakings; for by an act of his third parliament, he compelled "certain lords spiritual and temporal, and burrows, to make ships, busses, and boats, with nets, and other pertinents for fishing. That the same should be made in each burgh; in number according to the substance of each burgh, and the least of them to be of twenty tons: and that all idle men be compelled by the sheriffs in the country to go on board the same."

Numerous indeed have been the attempts made at different periods to secure this treasure to themselves, but without success. In the late reign, a very strong effort was made, and bounties allowed for the encouragement of British adventurers: the first was of 30s. *per* ton to every bus of 70 tons and upwards. This bounty was afterwards raised to 50s. *per* ton, to be paid to such adventurers as were intitled to it by claiming it at the places of rendezvous. The busses are from 20 to 90 tons burden, but the best size is 80. A vessel of 80 tons ought to take ten lasts, or 120 barrels of herrings, to clear expences, the price of the fish to be admitted to be a guinea a barrel. A ship of this size ought to have 18 men, and three boats: one of 20 tons should have six men; and every five tons above, require an additional hand. To every ton are 280 yards of nets; so a vessel of 80 tons carries 20,000 square yards: each net is 12 yards long, and 10 deep; and every boat takes out from 20 to 30 nets, and puts them together, so as to form a long train; they are sunk at each end of the train by a stone, which weighs it down to the whole extent: the top is supported by buoys, made of sheep-skin, with a hollow stick at the mouth, fastened tight; through this the skin is blown up, and then stopped with a peg, to prevent the escape of the air. Sometimes these buoys are placed at the top of the nets; at other times the nets are suffered to sink deeper, by the lengthening the cords fastened to them, every cord being for that purpose 10 or 12 fathoms long. But the best fisheries are generally in more shallow water.

Of the Scots fishery in the Western Isles, the following account is given by Mr Pennant*. "The fishing is always performed in the night, unless by accident. The busses remain at anchor, and send out their boats a little before sun-set; which continue out, in winter and summer, till day-light; often taking up and emptying their nets, which they do 10 or 12 times in a night, in case of good success. During winter it is a most dangerous and fatiguing employ, by reason of the greatness and frequency of the gales in these seas, and in such gales are the most successful captures: but by the Providence of Heaven, the fishers are seldom lost; and, what is wonderful,

* *Voyage to the Hebrides.*

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derful, few are visited with illness. They go out well prepared, with a warm great coat, boots, and skin aprons, and a good provision of beef and spirits. The same good fortune attends the busses, which in the tempestuous season, and in the darkest nights, are continually shifting, in these narrow seas, from harbour to harbour. Sometimes 10 barrels of herrings are taken in a night by the boats of a single vessel. It once happened, in Loch-Slappan, in Skie, that a bus of 80 tons might have taken 200 barrels in one night, with 10,000 square yards of net; but the master was obliged to desist for want of a sufficient number of hands to preserve the capture. The herrings are preserved by salting, after the entrails are taken out. This last is an operation performed by the country people, who get three-halfpence per barrel for their trouble; and sometimes, even in the winter, can gain fifteen pence a-day. This employs both women and children; but the salting is only entrusted to the crew of the busses. The fish are laid on their backs in the barrels, and layers of salt between them. The entrails are not lost, for they are boiled into an oil: 8000 fish will yield ten gallons, valued at one shilling the gallon. A vessel of 80 tons takes out 144 barrels of salt; a drawback of 2 s. 8 d. is allowed for each barrel used by the foreign or Irish exportation of the fish; but there is a duty of 1 s. per barrel for the home consumption, and the same for those sent to Ireland. The barrels are made of oak-staves, chiefly from Virginia, the hoops from several parts of Britain, and are either of oak, birch, hazel, or willow: the last from Holland, liable to a duty. The barrels cost about 3 s. each, they hold from 500 to 800 fish, according to the size of the fish; and are made to contain 32 gallons. The barrels are inspected by proper officers: a cooper examines if they are statutable and good; if faulty he destroys them, and obliges the maker to stand to the loss.

"Loch-broom has been celebrated for three or four centuries as the resort of herrings. They generally appear here in July; those that turn into this bay are part of the brigade that detaches itself from the western column of that great army which annually deserts the vast depths of the arctic circle, and come, heaven-directed, to the seats of population, offered as a cheap food to millions, whom wasteful luxury or iron-hearted avarice hath deprived, by enhancing the price of the wonted supports of the poor. The migration of these fish from their northern retreat is regular; their visits to the Western isles and coasts, certain; but their attachment to one particular loch, extremely precarious. All have their turns: that which swarmed with fish one year, is totally deserted the following; yet the next loch to it may be crowded with the shoals. These changes of place give often full employ to the busses, who are continually shifting their harbour in quest of news respecting these important wanderers. They commonly appear there in July; the latter end of August they go into deep water, and continue there for some time, without any apparent cause: in November, they return to the shallows, when a new fishery commences, which continues till January; at that time the herrings become full of roe, and are useless as articles of commerce. Some doubt, whether those herrings that appear in November are not part

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of a new migration; for they are as fat, and make the same appearance, as those that composed the first. The signs of the arrival of the herrings are flocks of gulls, who catch up the fish while they skim on the surface; and of gannets, who plunge and bring them up from considerable depths. Both these birds are closely attended to by the fishers. Cod-fish, haddocks, and dog-fish, follow the herrings in vast multitudes; these voracious fish keep on the outside of the columns, and may be a concurrent reason of driving the shoals into bays and creeks. In summer, they come into the bays generally with the warmest weather, and with easy gales. During winter the hard gales from north-west are supposed to assist in forcing them into shelter. East winds are very unfavourable to the fishery."

Herrings are cured either white or pickled, or red.

Of the *first*, those done by the Dutch are the most esteemed, being distinguished into four sorts, according to their sizes; and the best are those that are fat, fleshy, firm, and white, salted the same day they are taken, with good salt, and well barrelled. The British cured herrings are little inferior, if not equal, to the Dutch; for in spite of all their endeavours to conceal the secret, their method of curing, lasting, or casking the herrings, has been discovered, and is as follows. After they have hauled in their nets, which they drag in the stern of their vessel backwards and forwards in traversing the coast, they throw them upon the ship's deck, which is cleared of every thing for that purpose: the crew is separated into sundry divisions, and each division has a peculiar task; one part opens and guts the herrings, leaving the melts and roes; another cures and salts them, by lining or rubbing their inside with salt; the next packs them, and between each row and division they sprinkle handfuls of salt; lastly, the cooper puts the finishing hand to all, by heading the casks very tight, and stowing them in the hold.

Red herrings must lie 24 hours in the brine, in as much as they are to take all their salt there; and when they are taken out, they are spitted, that is, strung by the head on little wooden spits, and then hung in a chimney made for that purpose. After which, a fire of brush-wood, which yields a deal of smoke but no flame, being made under them, they remain there till sufficiently smoked and dried, and are afterwards barrelled up for keeping.

5. *Lobster*-FISHERY.* Lobsters are taken along the British channel, and on the coast of Norway, whence they are brought to London for sale; and also in the frith of Edinburgh, and on the coast of Northumberland. By 10 and 11 W. III. cap. 24. no lobster is to be taken under eight inches in length, from the peak of the nose to the end of the middle fin of the tail; and by 9 Geo. II. cap. 33. no lobsters are to be taken on the coast of Scotland from the first of June to the first of September.

6. *Mackrel†-FISHERY.* The mackrel is a summer fish † See Scot- of passage, found in large shoals, in divers parts of the ocean, not far north; but especially on the French and English coasts. The fishing is usually in the months of April, May, and June, and even July, according to the place. They enter the English channel

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nel in April, and proceed up to the straits of Dover as the summer advances; so that by June they are on the coasts of Cornwall, Sussex, Normandy, Picardy, &c. where the fishery is most considerable. They are an excellent food fresh; and not to be despised, when well prepared, pickled, and put up in barrels; a method of preserved them chiefly used in Cornwall.

The fish is taken two ways; either with a line or nets: the latter is the more considerable, and is usually performed in the night-time. The rules observed in the fishing for mackerel are much the same as those already mentioned in the fishery of herrings.

There are two ways of pickling them: the first is, by opening and gutting them, and filling the belly with salt, crammed in as hard as possible with a stick; which done, they range them in strata or rows, at the bottom of the vessel, strewing salt between the layers. In the second way, they put them immediately into tubs full of brine, made of fresh water and salt; and leave them to steep, till they have imbibed salt enough to make them keep; after which, they are taken out, and barrelled up, taking care to press them close down.

Mackerel are not cured or exported as merchandize from Britain, except a few by the Yarmouth and Leostoff merchants, but are generally consumed at home; especially in the city of London, and the sea-ports between the Thames and Yarmouth, east, and the Land's end of Cornwall, west.

† See O-
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7. *Oyster* †-FISHERY. This fishery, in Britain, is principally carried on at Colchester in Essex; Faversham and Milton in Kent; the Isle of Wight; the Swales of the Medway; and Tenby on the coast of Wales. From Faversham, and adjacent parts, the Dutch have sometimes loaded a hundred large hoys with oysters in a year. They are also taken in great quantities near Portsmouth, and in all the creeks and rivers between Southampton and Chichester: many of which are carried about by sea to London and to Colchester, to be fed in the pits about Wavenhoe and other places.

8. *Pearl*-FISHERY. See PEARL.

9. *Pilchard*-FISHERY. The chief pilchard fisheries are along the coasts of Dalmatia, on the coast of Bretagne, and along the coasts of Cornwall and Devonshire. That of Dalmatia is very plentiful: that on the coasts of Bretagne employs annually about 300 ships. Of the pilchard fishery on the coast of Cornwall the following account is given by Dr Borlase: "It employs a great number of men on the sea, training them thereby to naval affairs; employs men, women, and children, at land, in salting, pressing, washing, and cleaning; in making boats, nets, ropes, casks, and all the trades depending on their construction and sale. The poor are fed with the offals of the captures, the land with the refuse of the fish and salt; the merchant finds the gains of commission and honest commerce, the fisherman the gains of the fish. Ships are often freighted hither with salt, and into foreign countries with the fish, carrying off at the same time part of their tin. The usual produce of the great number of hogsheds exported each year for ten years from 1747 to 1756, inclusive, from the four ports of Fowey, Falmouth, Penzance, and St Ives, it appears that Fowey has exported yearly 1732 hogsheds; Falmouth, 14,631 hogsheds and two-thirds; Penzance and Mounts-Bay, 12,149

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hogsheds and one third; St Ives, 1282 hogsheds: in all amounting to 29,795 hogsheds. Every hogshed for ten years last past, together with the bounty allowed for each hogshed exported, and the oil made out of each hogshed, has amounted, one year with another at an average, to the price of 1 l. 13 s. 3 d.; so that the cash paid for pilchards exported has, at a medium, annually amounted to the sum of 49,532 l. 10 s."—The numbers that are taken at one shooting out of the nets are amazingly great. Mr Pennant says, that Dr Borlase assured him, that on the 5th of October, 1767, there were at one time inclosed in St Ives's Bay 7000 hogsheds, each hogshed containing 35,000 fish, in all 245 millions.

The pilchards naturally follow the light, which contributes much to the facility of the fishery: the season is from June to September. On the coasts of France they make use of the roes of the cod-fish as a bait; which, thrown into the sea, makes them rise from the bottom, and run into the nets. On the English coasts there are persons posted ashore, who, spying by the colour of the water where the shoals are, make signs to the boats to go among them to cast their nets. When taken, they are brought on shore to a warehouse, where they are laid up in broad piles, supported with backs and sides; and as they are piled, they salt them with bay-salt; in which lying to soak for 30 or 40 days, they run out a deal of blood, with dirty pickle and bitter: then they wash them clean in sea-water; and, when dry, barrel and press them hard down to squeeze out the oil, which issues out at a hole in the bottom of the cask.

10. *Salmon**-FISHERY. The chief salmon fisheries in Europe are in England, Scotland, and Ireland, in the rivers, and sea-coasts adjoining to the river-mouths. The most distinguished for salmon in Scotland are, the river Tweed, the Clyde, the Tay, the Dee, the Don, the Spey, the Nefs, the Bewly, &c. in most of which it is very common, about the height of summer, especially if the weather happens to be very hot, to catch four or five score salmon at a draught. The chief rivers in England for salmon are, the Tyne, the Trent, the Severn, and the Thames. The fishing is performed with nets, and sometimes with a kind of locks or weirs made on purpose, which in certain places have iron or wooden grates so disposed, in an angle, that being impelled by any force in a contrary direction to the course of the river, they may give way and open a little at the point of contact, and immediately shut again, closing the angle. The salmon, therefore, coming up into the rivers, are admitted into these grates, which open, and suffer them to pass through, but shut again, and prevent their return. The salmon is also caught with a spear, which they dart into him when they see him swimming near the surface of the water. It is customary likewise to catch them with a candle and lantern, or wisp of straw set on fire; for the fish naturally following the light are struck with the spear, or taken in a net spread for that purpose, and lifted with a sudden jerk from the bottom.

"The capture of salmon in the Tweed, about the month of July, (says Mr Pennant†) is prodigious. In a good fishery, often a boat-load, and sometimes near

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* See Sal-
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† Brit. Zool.
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Fishery. above 700 fish taken at one haul, but from 50 to 100 is very frequent. The coopers in Berwick then begin to salt both salmon and gillies in pipes and other large vessels, and afterwards barrel them to send abroad, having then far more than the London markets can take off their hands.

"Most of the salmon taken before April, or to the setting in of the warm weather, is sent fresh to London in baskets; unless now and then the vessel is disappointed by contrary winds of sailing immediately; in which case the fish is brought ashore again to the coopers' offices, and boiled, pickled, and kitted, and sent to the London markets by the same ship, and fresh salmon put in the baskets in lieu of the stale ones. At the beginning of the season, when a ship is on the point of sailing, a fresh clean salmon will sell from a shilling to eighteen pence a pound; and most of the time that this part of the trade is carried on, the prices are from five to nine shillings per stone; the value rising and falling according to the plenty of fish, or the prospect of a fair or foul wind. Some fish are sent in this manner to London the latter end of September, when the weather grows cool; but then the fish are full of large roes, grow very thin bellied, and are not esteemed either palatable or wholesome.

"The season for fishing in the Tweed begins November 30th, but the fishermen work very little till after Christmas: it ends on Michaelmas-day; yet the corporation of Berwick (who are conservators of the river) indulge the fishermen with a fortnight past that time, on account of the change of the style.

"There are on the river 41 considerable fisheries, extending upwards, about 14 miles from the mouth, (the others above being of no great value), which are rented for near 5400 l. *per annum*: the expence attending the servants wages, nets, boats, &c. amount to 5000 l. more; which together makes up the sum 10,400 l. Now, in consequence, the produce must defray all, and no less than 20 times that sum of fish will effect it; so that 208,000 salmon must be caught there one year with another.

"Scotland possesses great numbers of fine fisheries on both sides of that kingdom. The Scotch in early times had most severe laws against the killing of this fish; for the third offence was made capital, by a law of James IV. Before that, the offender had power to redeem his life. They were thought in the time of Henry VI. a present worthy of a crowned head: for in that reign the queen of Scotland sent to the duchess of Clarence 10 casks of salted salmon; which Henry directed to pass duty-free. The salmon are cured in the same manner as at Berwick, and a great quantity is sent to London in the spring; but after that time, the adventurers began to barrel and export them to foreign countries: but we believe that commerce is far less lucrative than it was in former times, partly owing to the great increase of the Newfoundland fishery, and partly to the general relaxation of the discipline of abstinence in the Romish church.

"Ireland (particularly the north) abounds with this fish: the most considerable fishery is at Cranna, on the river Ban, about a mile and a half from Coleraine. When I made the tour of that hospitable kingdom in 1754, it was rented by a neighbouring gentleman for L. 620 a-year; who assured me, that the tenant, his

predecessor, gave L. 1600 *per annum*, and was a much greater gainer by the bargain, for the reasons before-mentioned, and on account of the number of poachers who destroy the fish in the fence-months.

"The mouth of this river faces the north; and is finely situated to receive the fish that roam along the coast in search of an inlet into some fresh water, as they do all along that end of the kingdom which opposes itself to the northern ocean. We have seen near Ballicastle, nets placed in the sea at the foot of the promontories that jut into it, which the salmon strike into as they are wandering close to shore; and numbers are taken by that method.

"In the Ban they fish with nets 18 score yards long, and are continually drawing night and day the whole season, which we think lasts about four months, two sets of 16 men each alternately relieving one another. The best drawing is when the tide is coming in: we were told, that at a single draught there were once 840 fish taken.

"A few miles higher up the river is a wear, where a considerable number of fish that escape the nets are taken. We were lately informed, that, in the year 1760, about 320 tons were taken in the Cranna fishery."

Curing Salmon. When the salmon are taken, they open them along the back, take out the guts and gills, and cut out the greatest part of the bones, endeavouring to make the inside as smooth as possible: they then salt the fish in large tubs for the purpose, where they lie a considerable time soaking in brine; and about October, they are packed close up in barrels, and sent to London, or exported up the Mediterranean. They have also in Scotland a great deal of salmon salted in the common way, which after soaking in brine a competent time, is well pressed, and then dried in smoke: this is called *kipper*, and is chiefly made for home consumption; and if properly cured and prepared, is reckoned very delicious.

Sturgeon* FISHERY. The greatest sturgeon-fishery is in the mouth of the Volga, on the Caspian sea; * See *Asiatick Researches*. where the Muscovites employ a great number of hands, and catch them in a kind of inclosure formed by huge stakes representing the letter Z repeated several times. These fisheries are open on the side next the sea, and close on the other; by which means the fish ascending in its season up the river, is embarrassed in these narrow angular retreats, and so is easily killed with a harping-iron. Sturgeons, when fresh, eat deliciously; and in order to make them keep, they are salted or pickled in large pieces, and put up in kegs from 30 to 50 pounds. But the great object of this fishery is the roe, of which the Muscovites are extremely fond, and of which is made the *cavear*, or *kavia*, so much esteemed by the Italians. See **CAVEAR**.

Tunny-FISHERY. The tunny (a species of *Seomber*, which see), was a fish well known to the ancients, and made a great article of commerce: And there are still very considerable tunny-fisheries on the coasts of Sicily, as well as several other parts of the Mediterranean.

The nets are spread over a large space of sea by means of cables fastened to anchors, and are divided into several compartments. The entrance is always directed, according to the season, towards that part of the sea from which the fish are known to come. A

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Fishery.

man placed upon the summit of a rock high above the water, gives the signal of the fish being arrived; for he can discern from that elevation what passes under the waters infinitely better than any person nearer the surface. As soon as notice is given that the shoal of fish has penetrated as far as the inner compartment, or the chamber of death, the passage is drawn close, and the slaughter begins.

The undertakers of these fisheries pay an acknowledgment to the king, or the lord upon whose land they fix the main stay or foot of the tonnara; they make the best bargain they can: and, till success has crowned their endeavours, obtain this leave for a small consideration; but the rent is afterwards raised in proportion to their capture.

The tunny enters the Mediterranean about the vernal equinox, travelling in a triangular phalanx, so as to cut the waters with its point, and to present an extensive base for the tides and currents to act against, and impel forwards. These fish repair to the warm seas of Greece to spawn, steering their course thither along the European shores, but as they return, approach the African coast; the young fry is placed in the van of the squadron as they travel. They come back from the east in May, and abound on the coast of Sicily and Calabria about that time. In autumn they steer northward, and frequent the neighbourhood of Amalfi and Naples; but during the whole season stragglers are occasionally caught.

When taken in May, the usual time of their appearance in the Calabrian bays, they are full of spawn, and their flesh is then esteemed unwholesome, apt to occasion headaches and vapours; the milts and roes are particularly so at that season. To prevent these bad effects, the natives fry them in oil, and afterwards salt them. The quantity of this fish consumed annually in the two Sicilies almost exceeds the bounds of calculation. From the beginning of May to the end of October it is eaten fresh, and all the rest of the year it is in use salted. The most delicate part is the muzzel. The belly salted was called *tarantallum*, and accounted a great delicacy by the Romans; its present name is *Surra*. The rest of the body is cut into slices, and put into tubs.

Turbot-FISHERY. Turbots grow to a large size, some of them weighing from 23 to 30 pounds. They are taken chiefly off the north coast of England, and others off the Dutch coast. The large turbot (as well as several other kinds of flat fish) are taken by the hook and line, for they lie in deep water; the method of taking them in weirs or staked nets being very precarious. When the fishermen go out to fish, each person is provided with three lines, which are coiled on a flat oblong piece of wicker-work; the hooks being baited, and placed regularly in the centre of the coil. Each line is furnished with 14 score of hooks, at the distance of six feet two inches from each other. The hooks are fastened to the lines upon sneds of twisted horse-hair 27 inches in length. When fishing, there are always three men in each coble, and consequently nine of these lines are fastened together, and used as one line, extending in length near three miles, and furnished with 2520 hooks. An anchor and a buoy are fixed at the first end of the line, and one more of each at the end of each man's lines; in all four anchors, which

are common perforated stones, and four buoys made of leather or cork. The line is always laid across the current. The tides of flood and ebb continue an equal time upon the coast, and, when undisturbed by winds, run each way about six hours; they are so rapid that the fishermen can only shoot and haul their lines at the turn of tide, and therefore the lines always remain upon the ground about six hours; during which time the *myxine glutinosa* of Linnæus will frequently penetrate the fish that are on the hooks, and entirely devour them, leaving only the skin and bones. The same rapidity of tides prevents their using hand-lines; and therefore two of the people commonly wrap themselves in the sail, and sleep while the other keeps a strict look-out, for fear of being run down by ships, and to observe the weather. For storms often rise so suddenly, that it is with extreme difficulty they can sometimes escape to the shore, leaving their lines behind.

Besides the coble, the fishermen have also a five-men boat, which is 40 feet long and 15 broad, and 25 tons burden; it is so called, though navigated by six men and a boy, because one of the men is commonly hired to cook, &c. and does not share in the profits with the other five. This boat is decked at each end, but open in the middle, and has two large lug-sails. All the able fishermen go in these boats to the herring-fishery at Yarmouth in the latter end of September, and return about the middle of November. The oars are then laid up till the beginning of Lent, at which time they go off in them to the edge of the Dogger, and other places, to fish for turbot, cod, line, skates, &c. They always take two cobbles on board; and when they come upon their ground, anchor the boat, throw out the cobbles, and fish in the same manner as those do who go from the shore in a coble; with this difference only, that here each man is provided with double the quantity of lines, and instead of waiting the return of the tide in the coble, return to their boat and bait their other lines; thus hawling one set and shooting another every turn of tide. They commonly run into harbour twice a week to deliver their fish.

The best bait is fresh herring cut in pieces of a proper size; the five-men boats are always furnished with nets for taking them. Next to herrings are the lesser lampreys. The next baits in esteem are small haddocks cut in pieces, sand-worms, and limpets, here called *fidlers*; and when none of these can be had, they use bullock's liver. The hooks are two inches and a half long in the shank, and near an inch wide between the shank and the point. The line is made of small cording, and is always tanned before it is used.

Turbots are extremely delicate in their choice of baits; for if a piece of herring or haddock has been 12 hours out of the sea, and then used as bait, they will not touch it.

Whale* FISHERY. Whales are chiefly caught in the north seas: the largest sort are found about Greenland or Spitzbergen. At the first discovery of this country, whales not being used to be disturbed, frequently came into the very bays, and were accordingly killed almost close to the shore; so that the blubber being cut off was immediately boiled into oil on the spot. The ships in those times took in nothing but the pure oil and the whalebone, and all the business was executed

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in the country; by which means a ship could bring home the product of many more whales than she can according to the present method of conducting this trade. The fishery also was then so plentiful, that they were obliged sometimes to send other ships to fetch off the oil they had made, the quantity being more than the fishing ships could bring away. But time and change of circumstances have shifted the situation of this trade. The ships coming in such numbers from Holland, Denmark, Hamburgh, and other northern countries, all intruders upon the English, who were the first discoverers of Greenland, the whales were disturbed, and gradually, as other fish often do, forsaking the place, were not to be killed so near the shore as before; but are now found, and have been so ever since, in the openings and space among the ice, where they have deep water, and where they go sometimes a great many leagues from the shore.

The whale-fishery begins in May, and continues all June and July; but whether the ships have good or bad success, they must come away, and get clear of the ice, by the end of August: so that in the month of September at farthest they may be expected home; but a ship that meets with a fortunate and early fishery in May may return in June or July.

The manner of taking whales at present is as follows.—Every ship is provided with six boats, to each of which belong six men for rowing the boat, and an harpooner, whose business is to strike the whale with his harpoon. Two of these boats are kept constantly on the watch at some distance from the ship, fastened to pieces of ice, and are relieved by others every four hours. As soon as a whale is perceived, both the boats set out in pursuit of it, and if either of them can come up before the whale finally descends, which is known by his throwing up his tail, the harpooner discharges his harpoon at him. There is no difficulty in choosing the place where the whale is to be struck, as some have asserted; for these creatures only come up to the surface in order to spout up the water, or *blow*, as the fishermen term it, and therefore always keep the soft and vulnerable part of their bodies above water. A late improvement was made in the method of discharging the harpoon; namely, by shooting it out of a kind of swivel or musketoon; but it doth not appear, that since this improvement was made, the whale-fishing ships have had better success than before.—As soon as the whale is struck, the men set up one of their oars in the middle of the boat as a signal to those in the ship. On perceiving this, the watchman alarms all the rest with the cry of *fall! fall!* upon which all the other boats are immediately sent out to the assistance of the first.

The whale finding himself wounded, runs off with prodigious violence. Sometimes he descends perpendicularly; at others goes off horizontally, at a small depth below the surface. The rope which is fastened to the harpoon is about 200 fathoms long, and properly coiled up, that it may freely be given out as there is a demand for it. At first, the velocity with which this line runs over the side of the boat is so great, that it is wetted to prevent its taking fire: but in a short time the strength of the whale begins to fail, and the fishermen, instead of letting out more rope,

strive as much as possible to pull back what is given out already, though they always find themselves necessitated to yield at last to the efforts of the animal, to prevent his sinking their boat. If he runs out the 200 fathoms of line contained in one boat, that belonging to another is immediately fastened to the end of the first, and so on; and there have been instances, where all the rope belonging to the six boats has been necessary, though half that quantity is seldom required. The whale cannot stay long below water, but again comes up to blow; and being now much fatigued and wounded, stays longer above water than usual. This gives another boat time to come up with him, and he is again struck with an harpoon. He again descends, but with less force than before; and when he comes up again, is generally incapable of descending, but suffers himself to be wounded and killed with long lances which the men are provided with for the purpose. He is known to be near death when he spouts up the water deeply tinged with blood.

The whale being dead, is lashed along-side the ship. They then lay it on one side, and put two ropes, one at the head, and the other in the place of the tail, which, together with the fins, is struck off as soon as he is taken, to keep these extremities above water. On the off-side of the whale are two boats, to receive the pieces of fat, utensils, and men, that might otherwise fall into the water on that side. These precautions being taken, three or four men with irons at their feet to prevent slipping, get on the whale, and begin to cut out pieces of about three feet thick and eight long, which are hauled up at the capstane or windlafs. When the fat is all got off, they cut off the whiskers of the upper jaw with an ax. Before they cut, they are all lashed to keep them firm; which also facilitates the cutting, and prevents them from falling into the sea: when on board, five or six of them are bundled together, and properly stowed; and after all is got off, the carcase is turned a-drift, and devoured by the bears, who are very fond of it. In proportion as the large pieces of fat are cut off, the rest of the crew are employed in slicing them smaller, and picking out all the lean. When this is prepared, they stow it under the deck, where it lies till the fat of all the whales is on board; then cutting it still smaller, they put it up in tubs in the hold, cramming them very full and close. Nothing now remains but to sail homewards, where the fat is to be boiled and melted down into train-oil.

“It were in vain to speak in this place of the advantages that may be derived to Great Britain from the whale-fishery. We shall only remark, that the legislature, justly considering that trade as of great national importance, bestowed upon it at different periods very considerable encouragements. In particular, every British vessel of 200 tons or upwards, bound to the Greenland seas on the whale-fishery, if found to be duly qualified according to the act, obtained a licence from the commissioners of the customs to proceed on such voyage: and on the ship's return, the master and mate making oath that they proceeded on such voyage and no other, and used all their endeavours to take whales, &c. and that all the whale-

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whale-fins, blubber, oil, &c. imported in their ship, were taken by their crew in those seas, there was allowed 40 s. for every ton according to the admeasurement of the ship.

"It was afterwards found, however, that so great a bounty was neither necessary to the success of the trade, nor expedient with regard to the public. In 1786, therefore the acts conferring the said emoluments being upon the point of expiring, the subject was brought under the consideration of parliament; and it was proposed to continue the former measures, but with a reduction of the bounty from 40s. to 30 s. In proposing this alteration, it was stated, "that the sums which this country had paid in bounties for the Greenland fishery amounted to L.1,265,461; that, in the last year, we had paid L.94,658; and that, from the consequent deduction of the price of the fish, the public at present paid 60 per cent. upon every cargo. In the Greenland fishery there were employed 6000 seamen, and these seamen cost government L.13, 10s. per man per annum, though we were never able to obtain more than 500 of that number to serve on board our ships of war. Besides, the vast encouragement given to the trade had occasioned such a glut in the market, that it was found necessary to export considerable quantities; and thus we paid a large share of the purchase-money for foreign nations, as well as for our own people, besides, supplying them with the materials of several important manufactures." This proposition was opposed by several members, but was finally carried; and the propriety of the measure became very soon apparent. At that time (1786) the number of ships employed from England in the whale-fishery to Davis's Straits and the Greenland seas amounted to 139, besides 15 from Scotland. The proposed alteration took place the next year (1787); and notwithstanding the diminution of the bounty, the trade increased; the number of ships employed the same year from England amounting to 217, and the next year (1788) to 222."

FISHGARD, or FISCARD a town of Pembrokeshire, situated on a steep cliff on the sea-shore, 264 miles from London, at the influx of the river Gwaïne into the sea, which here forms a spacious bay. It is governed by a mayor, a bailiff and other officers; and here vessels may lie safely in five or six fathoms water. The inhabitants have a good trade in herrings, and annually cure, between Fishgard and Newport, above 1000 barrels of them. The town sends one member to parliament.

FISHING, in general the art of catching fish, whether by means of nets, or spears, or of the line and hook.

FISHING in the great, performed by the net, spear, or harpoon, for fish that go in shoals, has been explained in the preceding article. That performed by the rod, line, and hook, for solitary fish, is usually termed ANGLING: See that article; and for the particular manner of angling for the different kinds of fish, see their respective names, as DACE, EEL, PERCH, &c. The following were omitted in their order.

1. The *Barbel**, (so called on account of the bark or beard that is under his chops), though a coarse fish, gives considerable exercise to the angler's ingenuity. They swim together in great shoals, and are at their

worst in April, at which time they spawn, but come soon in season: the places whither they chiefly resort, are such as are weedy and gravelly rising grounds, in which this fish is said to dig and root with his nose like a swine. In the summer he frequents the strongest, swiftest, currents of water; at deep bridges, weirs, &c. and is apt to settle himself among the piles, hollow places, and moss, or weeds; and will remain there immoveable; but in the winter he retires into deep waters, and helps the female to make a hole in the sands to hide her spawn in, to hinder its being devoured by other fish. He is a very curious and cunning fish; for if his baits be not sweet, clean, well-scoured, and kept in sweet moss, he will not bite; but well-ordered and curiously kept, he will bite with great eagerness. The best bait for him is the spawn of a salmon, trout, or any other fish; and if you would have good sport with him, bait the places where you intend to fish with it a night or two before, or with large worms cut in pieces; and the earlier in the morning or the later in the evening that you fish, the better it will be. Your rod and line must be both strong and long, with a running plummet on the line; and let a little bit of lead be placed a foot or more above the hook, to keep the bullet from falling on it: so the worm will be at the bottom, where they always bite; and when the fish takes the bait, your plummet will lie and not choke him. By the bending of your rod you may know when he bites, as also with your hand you will feel him make a strong snatch; then strike, and you will rarely fail, if you play him well; but if you manage him not dexterously, he will break your line. The best time for fishing is about nine in the morning, and the most proper season is the latter end of May, June, July, and the beginning of August.

2. The *Bleak*†, is an eager fish, caught with all sorts of worms bred on trees or plants: as also with flies, paste, sheep's blood, &c. They may be angled for with half a score of hooks at once, if they can be all fastened on: he will also in the evening take a natural or artificial fly. If the day be warm and clear, there is no fly so good for him as the small fly at the top of the water which he will take at any time of the day, especially in the evening; but if the day is cold and cloudy, gentles and caddis are the best; about two feet under water. No fish yields better sport to a young angler than the bleak. It is so eager, that it will leap out of the water for a bait.

There is another way of taking bleak, which is by whipping them in a boat, or on a bank-side in fresh water in a summer's evening, with a hazel-top about five or six feet long and a line twice the length of the rod. But the best method is with a drabble, thus: Tie eight or ten small hooks across a line two inches above one another, the biggest hook the lowermost, (whereby you may sometimes take a better fish), and bait them with gentles, flies, or some small red worms, by which means you may take half a dozen or more at a time.

3. For the *Bream*‡, observe the following directions, which will also be of use in carp-fishing. Procure about a quart of large red worms; put them into fresh moss well washed and dried every three or four days, feeding them with fat mould and chopped fennel, and they will be thoroughly scoured in about three weeks.

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† See Cyprinus, 9.

‡ See Cyprinus, 51.

* See Cyprinus, 2.

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Let your lines be silk and hair, but all silk is the best: let the floats be either swan-quills or goose-quills. Let your plum be a piece of lead in the shape of a pear, with a small ring at the little end of it: fasten the lead to the line, and the line-hook to the lead, about ten or twelve inches space between lead and hook will be enough; and take care the lead be heavy enough to sink the float. Having baited your hook well with a strong worm, the worm will draw the hook up and down in the bottom, which will provoke the bream to bite the more eagerly. It will be best to fit up three or four rods and lines in this manner, and set them as will be directed, and this will afford you much the better sport. Find the exact depth of the water if possible, that your float may swim on its surface directly over the lead; then provide the following ground bait: take about a peck of sweet gross-ground-malt; and having boiled it a very little, strain it hard through a bag, and carry it to the water-side where you have sounded; and in the place where you suppose the fish frequent, there throw in the malt by handfuls squeezed hard together, that the stream may not separate it before it comes to the bottom: and be sure to throw it in at least a yard above the place where you intend the hook shall lie, otherwise the stream will carry it down too far. Do this about nine o'clock at night, keeping some of the malt in the bag, and go to the place about three the next morning: but approach very warily, lest you should be seen by the fish; for it is certain that they have their centinels watching on the top of the water while the rest are feeding below. Having baited your hook so that the worm may crawl to and fro, the better to allure the fish to bite, cast it in the place where you find the fish to stay most, which is generally in the broadest and deepest part of the river, and so that it may rest about the midst of your bait that is on the ground. Cast in your second line so that it may rest a yard above that, and a third about a yard below it.

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Let your rods lie on the bank with some stones to keep them down at the great ends; and then withdraw yourself, yet not so far but that you can have your eye upon all the floats: and when you see one bitten and carried away, do not be too hasty to run in, but give time to the fish to tire himself, and then touch him gently. When you perceive the float sink, creep to the water-side, and give it as much line as you can. If it is a bream or carp, they will run to the other side; which strike gently, and hold your rod at a bent a little while; but do not pull, for then you will spoil all; but you must first tire them before they can be landed, for they are very shy. If there are any carps in the river, it is an even wager that you take one or more of them: but if there are any pike or perch, they will be sure to visit the ground-bait, though they will not touch it, being drawn thither by the great resort of the small fish; until you remove them, it is in vain to think of taking the bream or carp. In this case, bait one of your hooks with a small bleak roach, or gudgeon, about two feet deep from your float, with a little red worm at the point of your hook; and if a pike be there he will be sure to snap at it. This sport is good till nine o'clock in the morning; and, in a gloomy day, till night: but do not frequent the place too much, lest the fish grow shy.

4. The carp*. A person who angles for carp must arm himself with abundance of patience, because of its extraordinary subtilty and policy: they always choose to lie in the deepest places either of ponds or rivers, where there is but a small running stream.

Fishing:
* See Carp
& Cyprinus.

Further, observe, that they will seldom bite in cold weather; and you cannot be too early or too late at the sport in hot weather: and if he bite you need not fear his hold; for he is one of those leather-mouthed fish that have their teeth in their throat.

Neither must you forget, in angling for him, to have a strong rod and line; and since he is so very wary it will be proper to entice him, by baiting the ground with a coarse paste.

He seldom refuses the red worm in March, the caddis in June, nor the grasshopper in June, April, and September.

This fish does not only delight in worms, but also in sweet paste; of which there is great variety; the best is made of honey and sugar, and ought to be thrown in the water some hours before you begin to angle; neither will small pellets thrown into the water two or three days before be worse for this purpose, especially if chickens guts, garbage, or blood mixed with bran and cow-dung, be also thrown in.

But more particularly as to paste very proper for this use, you may make it in the manner following: Take a sufficient quantity of flour, and mingle it with veal, cut small, making it up with a compound honey; then pound all together in a mortar till they are so tough as to hang upon the hook without washing off. In order to effect which the better, mingle whitish wool with it: and if you keep it all the year round, add some virgin wax and clarified honey.

Again, if you fish with gentles, anoint them with honey, and put them on your hook, with a deep scarlet dipped in the like, which is a good way to deceive the fish.

Honey and crumbs of wheat-bread, mixed together, make also a very good paste.

In taking a carp either in pond or river, if the angler intends to add profit to his pleasure, he must take a peck of ale-grains, and a good quantity of any blood to mix with the grains, baiting the ground with it where he intends to angle. This food will wonderfully attract the scale-fish, as carp, tench, roach, dace, and bream.

Leth him angle in a morning, plumbing his ground, and angling for carp with a strong line: the bait must be either paste or a knotted red worm; and by this means he will have sport enough.

Description of the proper Baits for the several sorts of Fish referred to in the annexed Table.

Flies. 1. Stone-fly, found under hollow stones at the side of rivers, is of a brown colour, with yellow streaks on the back and belly, has large wings, and is in season from April to July. 2. Green drake, found among stones by river-sides, has a yellow body ribbed with green, is long and slender, with wings like a butterfly, his tail turns on his back, and from May to Midsummer is very good. 3. Oak-fly, found in the body of an old oak or ash, with its head downwards, is of a brown colour, and excellent from May to September. 4. Palmer fly or worm, found on the leaves of plants, is commonly called a caterpillar, and when it comes to

Fishing. a fly is excellent for trout. 5. Ant-fly, found in ant-hills from June to September. 6. The May-fly is to be found playing at the river-side, especially against rain. 7. The black-fly is to be found upon every hawthorn after the buds are come off.

Pastes.] 1. Take the blood of sheeps-hearts, and mix it with honey and flour worked to a proper consistence. 2. Take old cheese grated, a little butter sufficient to work it, and colour it with saffron: in winter use rusty bacon instead of butter. 3. Crumbs of bread chewed or worked with honey or sugar, moistened with gum-ivy water. 4. Bread chewed, and worked in the hand till stiff.

Worms.] 1. The earth-bob, found in sandy ground after ploughing, it is white, with a red head, and bigger than a gentle: another is found in heathy ground, with a blue head. Keep them in an earthen vessel well covered, and a sufficient quantity of the mould they harbour in. They are excellent from April to November. 2. Gentles, to be had from putrid flesh: let them lie in wheat-bran a few days before used. 3. Flag-worms, found in the roots of flags; they are of a pale yellow colour, are longer and thicker than a gentle, and must be scowred like them. 4. Cow-turd-bob, or clap-bait, found under a cow-turd from May to Michaelmas; it is like a gentle, but larger. Keep it in its native earth like the earth-bob. 5. Cadis worm, or cod-bait, found under loose stones in shallow rivers; they are yellow, bigger than a gentle, with a black or blue head, and are in season from April to July. Keep them in flannel bags. 6. Lob-worm, found in gardens; it is very large, and has a red head, a streak down the back, and a flat broad-tail. 7. Marsh-worms, found in marshy ground; keep them in moss ten days before you use them: their colour is a bluish red, and are good bait from March to Michaelmas. 8. Brandling red-worms, or blood-worms found in rotten dunghills and tanners bark; they are small red-worms, very good for all small fish, have sometimes a yellow tail, and are called *tag-tail*.

Fish and Insects.] 1. Minnow. 2. Gudgeon. 3. Roach. 4. Dace. 5. Smelt. 6. Yellow frog. 7. Snail slit. 8. Grasshopper.

FISHING-Fly, a bait used in angling for divers kinds of fish. See *FISHING*.

The fly is either *natural* or *artificial*.

I. *Natural* flies are innumerable. The more usual for this purpose are mentioned in the preceding page.

There are two ways to fish with natural flies; either on the surface of the water or a little underneath it.

In angling for chevin, roach, or dace, move not your natural fly swiftly, when you see the fish make at it; but rather let it glide freely towards him with the stream: but if it be in a still and slow water, draw the fly slowly sidewise by him, which will make him eagerly pursue.

II. The *artificial* fly is seldom used but in blustering weather, when the waters are so troubled by the winds, that the natural fly cannot be seen, nor rest upon them. Of this artificial fly there are reckoned no less than 12 sorts, of which the following are the principal.

1. For March, the dun-fly; made of dun-wool, and the feathers of the partridge's wing; or the body made of black wool, and feathers of a black drake. 2. For April, the stone-fly; the body made of black wool, dyed yellow under the wings and tail. 3. For the beginning of May, the ruddy fly; made of red wool, and bound about with black-silk, with the feathers of a black capon hanging dangling on his sides next his tail. 4. For June, the greenish fly; the body made of black wool, with a yellow list on either side, the wings taken off the wings of a buzzard, bound with black broken hemp. 5. The Moorish fly, the body made of dusky wool, and the wings of the blackish mail of a drake. 6. The tawny fly, good till the middle of June; the body made of tawny wool, the wings made contrary one against the other, of the whitish mail of a white drake. 7. For July, the wasp-fly; the body made of black wool, cast about with yellow silk, and the wings of drakes feather. 8. The steel-fly, good in the middle of July: the body made with greenish wool, cast about with the feathers of a peacock's tail, and the wings made of those of the buzzard. 9. For August, the drake-fly; the body made with black wool cast about with black silk; his wings of the mail of a black drake, with a black head.

The best rules for artificial fly-fishing are,

1. To fish in a river somewhat disturbed with rain: or in a cloudy day, when the waters are moved by a gentle breeze: the south wind is best; and if the wind blow high, yet not so but that you may conveniently guard your tackle, the fish will rise in plain deeps; but if the wind be small, the best angling is in swift streams. 2. Keep as far from the water-side as may be; fish down the stream with the sun at your back, and touch not the water with your line. Ever angle in clear rivers, with a small fly and slender wings; but in muddy places, use a larger. 4. When, after rain, the water becomes brownish, use an orange fly; in a clear day, a light-coloured fly; a dark fly for dark waters, &c. 5. Let the line be twice as long as the rod, unless the river be encumbered with wood. 6. For every sort of fly, have several of the same, differing in colour, to suit with the different complexions of several waters and weathers. 7. Have a nimble eye, and active hand, to strike presently with the rising of the fish; or else he will be apt to spue out the hook. 8. Let the fly fall first into the water, and not the line, which will scare the fish. 9. In slow rivers, or still places, cast the fly across the river, and let it sink a little in the water, and draw it gently back with the current.

Salmon-flies should be made with their wings standing one behind the other, whether two or four. This fish delights in the gaudiest colours that can be; chiefly in the wings, which must be long as well as the tail.

FISHING by means of birds, a method peculiar to the Chinese, who train certain birds for the purpose in the same manner as falcons are taught to pursue game. See *CYPRINUS*; and *CHINA*, n° 121.

FISHING-Floats, are little appendages to the line, serving to keep the hook and bait suspended at the proper depth, to discover when the fish has hold of them, &c. Of these there are divers kinds; some made

An Epitome of the whole art of FISHING, wherein is shewn (at one view), the harbours, seasons, and depths, for catching all sorts of fish usually angled for; also the various baits for each, so digested as to contain the essence of all the treatises ever written on the subject, exempt from the superfluities, which tend more to perplex than instruct.

Names.	Where found.	Season.	Time to ang.	Depth from ground.	Proper Baits.			
					Flies. No	Pastes. No	Worms. No	Fish and Insects. No 8
Bream	rough str. river or mid. pond	April to Mich.	Sun-rise to 9 3 to Sun-set	touch ground		1 3	1 4 7	
Barbel	gravel-banks in currents under bridges	April to Aug.	very early or late	ditto		2	2 6 7	
Bleak	sandy bottom, deep rivers, ships	May to Oct.	all day	6 inches from bottom	1 2	3	2 3 8	
Carp	still deep mud-bottom, pond or river	May to Aug.	Sun-rise to 9 3 to Sun-set	3 inches from bottom hot weather, mid-water		1 3 4	1 2 3 4 7	
Chub or Chevin	ditto	May to Dec.	ditto	ditto	1 to 5	2	1 2 4 5	7 8
Dace	sandy bottom, deep rivers, ships	May to Oct.	all day	6 to 12 inches from bottom	ditto	3 4	1 to 5 & 8	
Gudgeon	gravel shoals	May to Oct.	ditto	near or on ground		ditto	2 8	
Pike	near clay banks	All the year.	ditto	mid-water	wh. stro. and snap	line float hook fixt	on shore	1 2 3 4 5 6 7
Perch	river in stream } gravel or weedy	May to Aug.	S.-rise to 10 3 to Sun-set	ditto	2	1	3 5 7 8	1 6
Roach	pond deepest part } bottom	Aug. to May.	mid-day	6 inches from bottom	5		all	
Salmon	deep holes in rivers	May to Oct.	all day	6 to 12 inches	1 2 4 5	3 4	ditto	8
Smelts	sandy bottom, deep rivers, ships	March to Sept.	8 to 9, 3 to 6	mid-way to the bottom	all large		1 5 6 7	1
Trout	ships sterns and docks	Apr. to Oct.	all day	mid-way to the bottom variable	all small		1 2 5	bits of smelts
Tench	purling streams and eddies of stony bottom river	Mar. to Mich.	ditto	cold weather, 6 inches to 9 hot weath. top to mid-wat.	1 to 5		1 2 5 to 8	1 8
Umber or Rayling	mud-bottom river or pond	All the year.	Sun-rise to 9 3 to Sun-set	cold wea. 3 inch. from bot. hot weather mid-water		1 3 4	1 3 4 to 7	
	clay bottom, swift stream	All the year.	all day	cold weather, 6 to 9 inches hot weath. top to mid-wat.	1 to 5		all	1 8

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made of Muscovy-duck quills, which are the best for slow waters; but for strong streams, found cork, without flaws or holes, bored through with an hot iron, into which is put a quill of a fit proportion, is preferable: pare the cork to a pyramidal form, and make it smooth.

FISHING-Hook, a small instrument made of steel-wire, of a proper form to catch and retain fish.

The fishing hook, in general, ought to be long in the shank, somewhat thick in the circumference, the point even and straight; let the bending be in the shank.

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For setting the hook on, use strong, but small silk, laying the hair on the inside of your hook; for if it be on the outside, the silk will fret and cut it asunder.

There are several sizes of these fishing-hooks, some big, some little: and of these, some have peculiar names; as, 1. Single hooks. 2. Double hooks; which have two bendings, one contrary to the other. 3. Snap-pers, or gorgers, which are the hooks to whip the artificial fly upon, or bait with the natural fly. 4. Spring-ers, or spring hooks; a kind of double hooks, with a spring, which flies open upon being struck into any fish, and so keep its mouth open.

FISHING-Line, is either made of hair twisted: or silk; or the Indian grass. The best colours are the sorrel, white, and grey; the two last for clear waters, the first for muddy ones. Nor is the pale watery green despicable; this colour is given artificially, by steeping the hair in a liquor made of alum, foot, and the juice of walnut-leaves, boiled together.

FISHING-Rod, a long slender rod, or wand, to which the line is fastened, for angling.—Of these there are several sorts; as, 1. A troller, or trolling-rod, which has a ring at the end of the rod, for the line to go through when it runs off a reel. 2. A whipper, or whipping-rod; a top-rod, that is weak in the middle, and top heavy, but all slender and fine. 3. A dropper; which is a strong rod and very light. 4. A snapper, or snap-rod; which is a strong pole, peculiarly used for the pike. 5. A bottom-rod; being the same as the dropper, but somewhat more pliable. 6. A sniggling or procking-stick; a forked stick, having a short strong line, with a needle, baited with a lobe worm: this is only for eels in their holes.

FISHING-Frog, or *Angler*. See **LOPHIUS**.

Right of FISHING, and property of fish. It has been held, that where the lord of the manor hath the soil on both sides of the river, it is a good evidence that he hath a right of fishing; and it puts the proof upon him who claims *liberam piscariam*: but where a river ebbs and flows, and is an arm of the sea, there it is common to all, and he who claims a privilege to himself must prove it; for if the trespass is brought for fishing there, the defendant may justify, that the place where is *brachium maris, in quo unusquisque subditus domini regis habet et habere debet liberam piscariam*. In the Severn the soil belongs to the owners of the land on each side; and the soil of the river Thames is in the king, but the fishing is common to all. He who is owner of the soil of a private river, hath *separalis piscaria*; and he that hath *libera piscaria*, hath a property in the fish, and may bring a possessory action for them; but *communis piscaria* is like the case of all other commons. One that has a close pond in which there are fish, may call them *pisces suos*, in an indictment, &c. but he cannot call them *bona & catalla*, if they be not in trunks. There needs no privilege to make a fish-pond, as there doth in the case of a warren. See **FRANCHISE**.

FISSURES, in the history of the earth, certain interruptions, that in an horizontal or parallel manner divide the several strata of which the body of our terrestrial globe is composed.

FISSURE of the Bones, in surgery, is when they are divided either transversely or longitudinally, not quite through, but cracked after the manner of glass, by any external force. See **SURGERY**.

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FISTULA, in the ancient music, an instrument of the wind-kind, resembling our flute or flageolet.

The principal wind-instruments of the ancients, were the tibia and the fistula. But how they were constituted, wherein they differed, or how they were played upon, does not appear. All we know is, that the fistula was at first made of reeds, and afterwards of other matters. Some had holes, some none; some again were single pipes; others a combination of several; witness the syringa of Pan.

FISTULA, in surgery, a deep, narrow, and callous ulcer, generally arising from abscesses.

It differs from a *sinus*, in its being callous, the latter not. See **SURGERY**.

FISTULA, in farriery. See **FARRIERY**, Sect. xxxii.

FISTULARIA, or **TOBACCO-PIPE FISH**; a genus of fishes belonging to the order of abdominales. Of this genus, Linnæus reckons two species; but we have a description only of one, viz. the *tabacaria*. It is described by Mr Catesby, from the only one he ever saw. It was almost a foot in length; the fore-part from the nose to half-way the body of nearly equal bigness; from whence it grew tapering to the tail, which was forked, and from which grew a slender taper whip, four inches long, of the consistence of whalebone; the mouth narrow, from which to the eyes was almost three inches. The whole fish was of a brown colour. They are sometimes taken on the coasts of Jamaica.

FIT. See **PAROXYSM**.

Dr Cheyne is of opinion, that fits of all kinds, whether epileptic, hysteric, or apoplectic, may be cured solely by a milk-diet, of about two quarts of cows-milk a-day, without any other medicine.

FITCHES, in husbandry, a sort of pulse, more generally known by the name of *chick-pea*. See **CICER**.

Fitches are cultivated either for feeding cattle, or improving the land. They make a wholesome and nourishing food, whether given in the straw or threshed out. When sown only to improve the soil, they are plowed in just as they begin to blossom, by which means a tough stiff clay-soil is much enriched.

FITCHET, a name used in some places for the weasel, called also the *foumart*. See **MUSTELA**.

FITCHY, in heraldry, (from the French *fishé*, i. e. *fixed*); a term applied to a cross when the lower branch ends in a sharp point: and the reason of it Mackenzie supposes to be, that the primitive Christians were wont to carry crosses with them wherever they went; and when they stopped on their journey at any place, they fixed those portable crosses in the ground for devotion's sake.

FITZ, makes part of the surname of some of the natural sons of the kings of England, as *Fitz-roy*; which is purely French, and signifies the "king's son."

FITZHERBERT (Sir Anthony), a very learned lawyer in the reign of king Henry VIII. was descended from an ancient family, and born at Norbury in Derbyshire. He was made one of the judges of the court of common pleas in 1523; and distinguished himself by many valuable works, as well as by such an honourable discharge of the duties of his office, as made him esteemed an oracle of the law. His writings are, *The Grand Abridgment*; *The Office and Authority of Justices of Peace*; *the Office of Sheriffs, Bailiffs of Liberties, Escheators, Constables, Coroners, &c.*; *Of the Diversity of*

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Courts;

Fistula

Fitzherbert.

Plate
CXCVI.

Jacob's Law
Dia.

Fitz-Stephen *Courts; The New Natura Brevium; Of the Surveying of Lands; and The Book of Husbandry.* He died in 1538.

Fixed Air.

FITZ-STEPHEN (William), a learned monk of Canterbury, of Norman extraction, but born of respectable parents in the city of London. He lived in the 12th century; and being attached to the service of archbishop Becker, was present at the time of his murder. In the year 1174, he wrote in Latin, *The Life of St Thomas, archbishop and martyr*; in which, as Becker was a native of the metropolis, he introduces a description of the city of London, with a miscellaneous detail of the manners and usages of the citizens: this is deservedly considered as a great curiosity, being the earliest professed account of London extant. Fitz-Stephen died in 1191.

FIVES, or VIVES. See **FARRIERY**, Sect. xiv. 2.

FIXATION, in chemistry, the rendering any volatile substance fixed, so as not to fly off upon being exposed to a great heat: hence,

FIXED BODIES, are those which bear a considerable degree of heat without evaporating, or losing any of their weight. Among the most fixed bodies are diamonds, gold, &c. See **DIAMOND**, **GOLD**, &c.

FIXED, or *Fixable Air*, an invisible and permanently elastic fluid, superior in gravity to the common atmospheric air and most other aerial fluids, exceedingly destructive to animal life; produced in great quantities, naturally from combustible bodies, and artificially by many chemical processes. From its apparently acid properties it has obtained the name of *aerial acid*, *cretaceous acid*, and *carbonic acid*; from its noxious qualities, it has been called *mephitic air*, or *mephitic gas*; and, from the circumstance of being produced in vast quantities during the combustion of charcoal, it first obtained from Van Helmot the name of *gas sylvestre*. The term *fixed air* has been given from its property of readily losing its elasticity, and fixing itself in many bodies, particularly those of the calcareous kind; and though some objected to the propriety of the term, the fluid in question is so well known by the name of fixed air, that we choose still to retain it.

The nature and properties of fixed air are explained under the article **AEROLOGY**. It is there considered as an acid, and the reasons for supposing it to be composed of phlogiston and dephlogisticated are set forth. In a paper of the Manchester Transactions by Mr Delaval on the permanent colours of opaque bodies, he considers the nature of fixed air, and gives an account somewhat different. He denies its acid property, which has been generally looked upon as so well ascertained. of fixed air. "The change of colour produced in vegetable juices by the electric spark (says he), is adduced as a proof of the acidity of fixed air; but it has been already shown, that this does not arise from acid, but phlogistic matter*." The acid quality of fixed air is also generally inferred from its power of dissolving iron. But phlogiston is also a solvent of iron. Thus a considerable portion of that metal is always dissolved and held in solution by the phlogisticated alkaline lixivium, which consists of inflammable matter calcined with fixed alkali. M. Margraaf has shown, that several other metals are soluble in this lixivium. Hence it is evident, that the solubility of iron does not prove

Mr Delaval's theory of fixed air.

* See *Chromatics*, n^o 31.

the acidity of the solvent, but may arise from the phlogiston contained in it. Fixed Air.

"Fixed air is also supposed to be an acid, by diminishing the causticity and promoting the crystallization of fixed alkalies: but this hypothesis does not agree with the effects which are produced by the combination of acids with alkalies. By these combinations neutral salts are produced; but alkalies do not become neutral by combination with fixed air, being only changed by such an union from caustic and deliquescent to mild and crystallizable alkalies: whence it is evident, that the alteration in them produced by fixed air, is not to be attributed to the introduction of an acid.

"We must therefore (continues our author) turn our eyes to the consideration of some other principle by which these effects may be produced; and this principle appears to be phlogiston. The phlogisticated alkaline lixivium is perfectly mild when saturated; and by a slight evaporation is reduced to a concrete crystalline mass, which does not deliquesce or imbibe the least moisture from the air, and no longer retains any alkaline character or property. M. Beaumé, by an elegant and ingenious experiment, has proved the presence of phlogiston in mild alkalies; and has shown, that their power of crystallizing depends upon their union with that principle. He heated in a silver vessel a lixivium of mild alkali, which imparted to the silver a covering or coating of inflammable matter, by which its surface was tarnished and became black. The lixivium was several times poured out in the silver vessel; and after the surface of the vessel had been freed from the tarnish, the lixivium was replaced in it, and again heated, by which the tarnish was renewed. This was repeated till the lixivium no longer communicated any stain to the silver. The causticity of the lixivium increased in proportion as it imparted its phlogiston to the silver; and at the end of the process the alkali became perfectly caustic and incapable of crystallizing.

"Those instances, and many others which might be adduced, seem to prove, that the change which fixed air produces in caustic alkalies is not effected by acid but phlogistic matter. It is certain, that the matter communicated to lime by fixed air, is the very same which it imparts to alkalies: for it may be transferred, unchanged, from one of these substances to another; and when united to either of them, still retains the same qualities. Therefore, if phlogiston renders alkalies mild, and effects their crystallization, the same principle also precipitates lime, and in like manner restores it to its state of mild calcareous earth.

"The experiments and observations on which Dr Black has established his comprehensive and consistent theory, clearly prove, that lime is precipitated from lime-water by fixed air; but his views were not extended to an investigation of the particular matter or quality whereby fixed air operates that effect.

"Lime, which has been precipitated from lime-water, and restored to the state of a mild calcareous earth, is again soluble by the addition of a larger proportion of fixed air; which has been considered as an additional proof of the acidity of the latter. It has also been considered as an extraordinary circumstance, that two such opposite effects should be produced by the same substance.

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Fixed Air. The simplicity observed by nature in her operations, however, will not allow us to suppose that fixed air is possessed of two different or opposite qualities, by one of which it precipitates, and by the other it dissolves. The precipitation of lime from lime-water, and its resolution, are effected by an equable uniform action, exercised by one and the same principle, which is a constituent and essential part of fixed air. Such a precipitation and resolution are not extraordinary or complex phenomena, as has been thought, but are analogous to the ordinary and constant effects which arise from chemical affinities. This may be exemplified by any compound which assumes a concrete and solid consistence by its union with a given quantity of fluid, and which by the addition of a larger quantity of the same fluid is reduced to a liquid state. Thus, when a due proportion of water is added to iron and vitriolic acid, a mutual attraction takes place between these three ingredients, by means of which they are united; and, by their combination, a concrete vitriolic or metallic salt is formed. But if a greater quantity of water be added to this concrete salt, as the mutual attraction after this addition subsists equably between the vitriolic salt and the whole mass of water, the acid and ferruginous particles are more minutely divided, and diffused uniformly throughout every part of the water. Thus the solid concrete salt is resolved, and a vitriolic liquor is formed, in which the water predominates.

"Lime strongly attracts and unites with inflammable substances, as sulphur, camphor, and resins. Fixed air has a still greater affinity with it; because, in all the more gross substances, the phlogiston is allayed with salt, earth, and other matters: but in fixed air it exists in a purer, and consequently a more active state.

"As alkalies are rendered mild or caustic by the presence or absence of the inflammable principle, it can hardly be doubted that the difference between mild and calcareous earth and quicklime is also occasioned by a communication or deprivation of the same principle.

"The origin of fixed air seems to prove its phlogistic nature; for all bodies which yield it, yield also inflammable matter, but many of them do not yield any acid. Calcareous spar, magnesia, and alkaline salts, send forth fixed air; and all these substances, by the loss of it, are deprived of their inflammable contents. Diamonds, exposed to the focus of a burning glass under a receiver, impart to the air contained in it a power of precipitating lime from lime-water when it is agitated with it: But it does not appear that any acid can be derived from these bodies.

"Some of the properties of fixed air are consistent with either the character of an acid or phlogiston. Such are, its power of altering the colour of vegetable juices; its affinity to alkalies, and ready union with lime; its power of dissolving iron, which is instanced in all acids, and likewise in the phlogisticated alkaline lixivium. The antiseptic quality prevails equally in acids, and in inflammable spirits. Acids are disengaged from substances which are decomposed by stronger acids; phlogiston is likewise expelled from bodies which dissolve in acids.

"The qualities of acid and phlogiston agree in these and several other instances; but fixed air is endowed

with properties which are peculiar to phlogiston: such Fixed Air, as its power of effecting the crystallization of alkalies without changing them to neutral salts; its tendency to escape from water; and its affinity with the air, by means of which a considerable quantity of fixed air is united with and diffused throughout every part of the atmosphere.

"Water, as well as phlogiston, is a constituent part of all substances which yield fixed air. Both these principles have a strong affinity to air. This appears from the union which air forms with the inflammable principle when it is disengaged from bodies by combustion, fermentation, putrefaction, or any other mode of decomposition; and from the mutual attraction of water and air, which is manifested by evaporation, and by the constant presence of aqueous particles in the atmosphere.

"The laws of chemical analysis will hardly permit us to doubt that the air which is obtained from mild alkalies, calcareous earth, and various other substances, receives from them, when they are decomposed, the same contents which were united in them as constituent parts while they were in their entire state; and their analysis invariably shews, that air, water, and phlogiston enter their composition.

"Hence it seems to follow, that fixed air consists of these three ingredients, either united in bodies, and discharged from them already combined, or that it is formed in the atmosphere by the concurrence and union of these principles: and the phenomena both of fixed and phlogisticated air may be solved by the action and properties of these ingredients.

"The weight of fixed air indicates that it contains a considerable portion of aqueous matter; and it is by means of this constituent principle that it is miscible with water, in like manner as ardent spirits are, notwithstanding their inflammable nature.

"Phlogistic matters are miscible with water only in proportion as they contain a quantity of the aqueous principle in their composition. When the relative proportion of this constituent principle is less than that of the phlogiston combined with such matters, they are either immiscible with water, or miscible only in part. Thus, spirit of wine unites with water in all proportions. Ether, which is spirit of wine deprived of part of its water by means of the vitriolic acid, is not miscible with water in all proportions; but ten parts of water are requisite to the absorption of one part of ether. Oil, which has still less water in its composition, does not in any degree mix with water. Resinous substances do not combine with water, because their aqueous part is not in sufficient quantity to serve as a medium for the union of their phlogiston. In gums the relative proportion of phlogiston is much less than in resins, and that of the water is much greater; and, by the intervention of their aqueous part, gums are readily miscible with water. Resins, when united with a due proportion of gum, are by its mediation also rendered soluble in water. But if a less proportion of the gum be joined with the resin, only a part of the compound resulting from this union is disposed to mix with water, and a residuum is left which is incapable of being dissolved in any aqueous liquor.

Fixed Air. "Fixed air seems to resemble those matters which do not possess a sufficient quantity of aqueous matter to render them totally soluble in water; for after a given portion of fixed air has been imbibed by water, a residuum remains which is incapable of being absorbed by it, and is called *phlogisticated air*. This air may be formed from fixed air, not only by the subtraction of water, but by the addition of the inflammable principle; as when phlogiston is communicated to fixed air by electric sparks, or the vapours disengaged from a mixture of sulphur and iron-filings.

"The origin of phlogisticated air, shows that its difference from fixed air consists chiefly in the deficiency of water. Hence, as metals contain no water, the phlogiston which arises from them during calcination produces no fixed but phlogisticated air. But vitriols, and all other saline matters, containing water as a constituent part, yield fixed air. Calces of metals also, which have received aqueous matter in the process of their calcination, as white-lead and other calces, which have absorbed water, together with the air, from the atmosphere, yield also fixed air. The fermentation and putrefaction of animal and vegetable substances is effected by means of their moisture, and therefore fixed air is produced in these processes. It is more effectually produced by respiration than by many other phlogistic processes, in consequence of the copious supply of the aqueous as well as the phlogistic principle, which the air receives from the lungs.

"Fixed air may be formed from vegetable acids; but when it is thus constituted, it does not differ from that which is produced from alkalies, magnesia, and other substances which yield no acid. It is therefore evident, that in each of these instances it is formed by the combination of some principles which are common to all those substances. These principles are water and phlogiston. In vegetable acids, the phlogiston combined with the water is equal in quantity to that which constitutes the inflammable part of spirit of wine; for radical or concentrated vinegar is totally inflammable. The acid state of vegetable matters is not essential to them, nor is it requisite to the production of fixed air from them; for fixed air is producible from recent plants. Hence it appears, that in their acid, as well as in their recent, vinous, or putrefactive state, they yield fixed air by means of their aqueous and phlogistic principles.

"All fixed air, from whatever subject it may be procured, or to whatever bodies it is transferred, consists constantly and invariably of the same materials, combined in the same proportions; otherwise it could not restore lime, caustic alkalies, &c. to their original mild state; because these substances cannot be recomposed but by the same proportion of their constituent principles which they contained before their decomposition. Thus, lime cannot be restored to the state of mild calcareous earth by water or by pure dephlogisticated air, because each of these principles consists only of one of the three ingredients which are requisite for that purpose. Nor can the recomposition of calcareous earth be effected by phlogisticated air, because it contains an excess of phlogiston, and a defect of water. Compounds formed of such ingredients as do not contain a requisite quantity of the principles

necessary to constitute fixed air, may acquire a due proportion of them by an addition of the ingredients in which they are deficient. Pure dephlogisticated air is reduced to fixed air by the communication of aqueous and phlogistic vapours disengaged from bodies by various processes: these principles have a great affinity to air, and readily combine with it. Phlogisticated air, when agitated with water, receives into its composition a quantity of aqueous particles sufficient to constitute it fixed air; and by that means it becomes capable of precipitating lime from lime-water. If the analysis and recomposition of calcareous earth be ever so often repeated, its analysis will always yield, and its recomposition will always require, the same relative quantities of air, water and phlogiston. Fixed air therefore seems to consist of these three principles invariably and constantly combined in the same proportions. It has been frequently considered as a mere compound of air and phlogiston; but such a compound seems to approach nearer in its nature to phlogisticated air, as it is deficient in one of the principles which is essential to fixed air."

On this account of fixed air it may be observed, that notwithstanding all our author's arguments, there is no positive proof adduced against the acidity of fixed air. It is not certainly known whether mere phlogiston will perfectly neutralize alkalies. The colouring matter of Prussian blue indeed will certainly do so: but this is not pure phlogiston, but a compound of different substances; and besides the alkalies neutralized by it differ very considerably from those rendered neutral by fixed air. Before we can attribute the effects of fixed air to mere phlogiston, therefore, it would be necessary to form out of a caustic alkali, by means of pure phlogiston, a salt exactly resembling mild alkali produced by the union of the same caustic salt with fixed air; so that it shall not only have the same taste and other external properties, but likewise emit fixed air upon the addition of a mineral acid. But by no experiment have we yet been able to effect this. It is absolutely necessary that the invisible and unknown substance called by Lavoisier the *oxygeneous principle*, by others the *basis of dephlogisticated or vital air*, should be united to the inflammable matter, in order to the formation of the fixed air: and as this basis is likewise found to be necessary to the formation of every acid, or at least to those of the mineral kind, we have equal reason to call fixed air an acid while it displays the properties of one.

That water is an essential ingredient in the composition of fixed air as well as all other kinds of aerial vapours, is not to be doubted; but we are by no means certain whether the difference between fixed and phlogisticated air consists in the want of water in the latter. The specific gravity here cannot be any rule for us to judge of the matter: for inflammable air, the lightest of all the kinds hitherto known, cannot be produced without a certain proportion of water; and by some processes fixed air may be converted into inflammable as well as phlogisticated air.

The noxious properties of fixed air are well known, and are too often fatally experienced by the miners, who have given it the appellation of *choke-damp*. In the Manchester Transactions, however, we have an account of the effects of this air on a person long exposed to it.

Fixed Air. account of one who continued seven days below ground, not only exposed to the effects of this gas, but without any kind of sustenance; notwithstanding which, he was taken out alive. When first found in the pit, the sides of which had fallen in and confined him for the time abovementioned, his eyes were so swollen and protruded out of their sockets, that he had a shocking appearance; for which reason, the people tied a handkerchief round his head. While in this protruded state, however, he was capable of distinguishing objects; but in a little time his eyes sunk within their sockets, and he became quite blind. On being taken out of the pit, he seemed for some time to be in a way of recovery; but all favourable symptoms soon vanished, and he expired in three days after his release.

During all the time of his confinement he had only a space to breathe in of three yards in length and two in breadth, in which he lay upon his belly. It communicated indeed with another pit by a passage 80 yards in length and about eight or ten inches wide; but as the mouth of the pit into which he descended was stopped, and the body of earth through which he had dug thrown behind him, no circulation of air could possibly take place. The truth of this conclusion was likewise evinced by the state of the air in the other pit through which the people entered to dig out the unfortunate sufferer; for it was there so foul, that the candles they carried down with them were immediately extinguished. In this state of the air which surrounded him, it is remarkable that the patient, who was naturally asthmatic, breathed freely and continued to do so till his death: And on his subject Dr Percival makes the following remarks.

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“As he had been long asthmatic, we may reasonably conclude from his suffering so little, that the commonly received opinion of the *suffocating* nature of the mephitic or choke-damp, that it destroys the elasticity of the air, and occasions a collapion of the lungs, is without foundation, notwithstanding all the respectable authorities that may be advanced in support of it. Indeed, from the phenomena which attend the extinction of life in those to whom such vapours have proved mortal, it is evident that the poison acts chiefly on the nervous system. The vital principle seems to be arrested and almost instantaneously destroyed; sometimes even without a struggle, and possibly without any antecedent pain. Pliny the elder was found, after the fatal eruption of Mount Vesuvius, exactly in the posture in which he fell, with the appearance of one asleep rather than dead. Some persons killed by foul air in a cellar at Paris, were found stiff as statues, with their eyes open, and in the posture of digging. M. Beaumé relates the history of a man who was recovered from apparent death produced by a similar cause, and who asserted that he had neither felt pain nor oppression; but that at the point of time when he was losing his senses, he experienced a delightful kind of delirium. This account receives some confirmation from what Dr Heberden says in his lectures on poisons, that he had seen an instance in which the fumes of charcoal brought on the same kind of delirium that is produced by henbane and other intoxicating poisons of the vegetable kind. Abbé Fontana breathed a certain portion of inflammable air, not

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only without inconvenience, but with unusual pleasure. He had a facility in dilating the breast, and never felt an equally agreeable sensation even when he inhaled the purest dephlogisticated air. But he suffered greatly in a subsequent experiment: for having filled a bladder, containing about 350 cubic inches, with inflammable air he began to breathe it boldly after discharging the atmosphere air contained in his lungs by a violent expiration. The first inspiration produced a great oppression; towards the middle of the second, he was observed to become very pale, and objects appeared confused to his eyes: nevertheless he ventured on a third; but his strength now failed, so that he fell upon his knees, and soon afterwards upon the floor. His respiration continued to be effected with pain and difficulty, and he did not perfectly recover till the succeeding day. In this instance some degree of palsy was probably induced in the nerves of the lungs by the action of concentrated inflammable air conveyed into the vesicles forcibly emptied of their atmospheric air by expiration. For, in ordinary respiration, about 35 inches of air are inhaled and exhaled; but in a violent expiration, about 60 cubic inches may be discharged. In the case of the unfortunate collier (Travis), it will be remembered, that the air was sufficiently salubrious when he went down into the pit; that by stagnation it became gradually noxious; and that his nervous system must therefore have been progressively habituated to its influence. This is conformable to the observations of Dr Priestley; who found, that if a mouse can bear the first shock of being put into a vessel filled with artificial gas, or if the gas be increased by degrees, it will live a considerable time in a situation that would instantly prove fatal to other mice: and he frequently noticed, that when a number of mice had been confined in a given quantity of infected air, a fresh mouse introduced among them has immediately died in convulsions.

“It has been found by experiment, that the fumes emitted by almost every species of burning fuel prove fatal to animals, when applied in a sufficiently concentrated state. I have computed, that 300 tons of coal are every day consumed in the town of Manchester during the winter season. The factitious gas generated by its consumption must amount to at least a third part of that quantity; it is probable that the smoke proceeding from it constitutes another third part; and both together are capable of occupying a space of very wide extent. Now, if it were not for the dispersion of these vapours by the wind, the precipitation of them by rain, and the influence of other causes, respiration could not be carried on in such circumstances. And we may observe, that frosty weather, which is generally serene and without wind, proves extremely oppressive, and sometimes even fatal, to asthmatic patients, especially in great cities. Indeed the rate of human mortality is nearly in proportion to their magnitude and population. It is evident, therefore, that habit, however it may abate, cannot entirely counteract the baneful effects of bad air; and those will feel its effects the more strongly, in every situation, whose nervous systems are endowed with more than ordinary sensibility. Such persons I would caution not to indulge their curiosity in the inspection of unwholesome manufactures, nor in visiting mines, caverns, stoves,

Fixed Air.

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Fixed Air. stoves, hospitals, or prisons. The late Dr Brown suffered very severely by accompanying two foreigners of distinction into the duke of Bridgewater's works at Worsley. It happened that they were the first who entered the tunnel on that day. The candles which they carried with them were observed to burn very dimly; but neither the passengers nor the boatmen experienced any difficulty in respiration. After remaining in the coal-pits a considerable time, they proceeded to Warrington, where Dr Brown was attacked by violent pains, which shifted suddenly from one part of his body to another; small purple spots overspread his skin; his throat became tumefied so as to render swallowing difficult; and great prostration of strength, with a low fever, ensued. The doctor was subject to the anomalous gout; had once a paralytic complaint of long continuance, and hence we may conclude that his nervous system was endowed with peculiar irritability. He was not, however, the only sufferer; for one of the foreigners was affected with similar petechiæ, but attended with little pain or disorder."

7
In what manner the atmosphere may be purified from too great a quantity of fixed air.

Here we may observe, that our knowledge of the composition of fixed air seems to throw some light upon the subject in question. Dephlogisticated air and phlogiston are universally allowed to be the component parts; and whether we suppose, with Mr Delaval, water to be a third ingredient or not, the case will still be the same; for by whatever means the separation of the phlogiston can be effected, the air will be rendered pure. This is ascertained by some of Dr Priestley's experiments, particularly those related under the article AEROLOGY, n° 113. where the phlogiston was plainly separated by the electric spark, and the dephlogisticated air remained in a state of purity. When the atmosphere is contaminated by a mixture of fixed air, therefore, it may be purified in two very different ways: one is by the absorption of the gas without any decomposition, as by lime-water, alkaline salts, &c. the other, by the separation of its component parts, by which a portion of it must necessarily be exchanged for a portion of pure respirable air. It is probable that nature pursues both these methods in freeing the atmosphere from this noxious gas: but indeed, whatever method she takes, it is certain that any large portion of atmospheric air cannot long be contaminated with this gas, even though seemingly in a confined situation. This is evident from some experiments, where large quantities of fixed air being poured out into the atmosphere of a room, entirely vanished, so that it could not be perceived by the nicest test, in half an hour. As we are not yet acquainted with the action of the atmospheric and fixed air upon each other, when the former is in large proportion, it naturally becomes a matter of suspicion whether the fixed air has not a natural tendency to decomposition, and consequently to render the air salutary after it has for a short time rendered it noxious. This is certainly the case when it meets with vegetables; for many of them are supported by every kind of noxious air. In cases where many animals are confined together, it is probable that their death is not occasioned by the *fixed air* produced from their respiration, but by that which is called *phlogisticated*, or most probably by the total deprivation of the vital principle supplied by the de-

phlogisticated kind. The perspiration of animal bodies of itself supplies a resource for the absorption of pure fixed air; for all animal exhalations are of the alkaline kind, and therefore are capable of neutralizing this kind of gas. This is evident from a circumstance generally unnoticed, but which is obvious to every one who chooses to give himself the trouble of inquiry. In washing over the walls of rooms with lime and water, which is the first preparatory operation for painting, a violent smell of volatile alkali is perceptible; and there can be no doubt that this proceeds from a decomposition of the neutral salt formed by the union of the fixed air, produced in respiration, with the subtil phlogistic and alkaline effluvia which rise in perspiration. To this cause we may in a great measure ascribe the preservation of the Russians, which Dr Percival also takes notice of, but ascribes it to an *accommodating* quality of the human frame by which it can subsist in so great a variety of circumstances. "A Russian boor (says he), in the winter season, experiences all the varieties of air, heat, and cold, without any inconvenience. When labouring out of doors, he is exposed to the intensity of frost and snow; when he retires in the evening to his hut, which consists only of one close apartment, never ventilated during six months, he feeds upon salted fish or flesh, and afterwards reposes on a greasy matrafs placed over an oven in which billets of wood are burned. In this situation he is literally stewed, with his whole family, who live in a constant steam, not offensive to themselves, but scarcely supportable by a stranger. The atmosphere of a crowded town must, in many respects, resemble the foul air of a Russian cottage; yet thousands enjoy in it a considerable share of health."

8
On this we must further observe, that in certain cases the human body requires much more the vital principle supplied by dephlogisticated air to support life than in others. This is particularly the case when much motion and exercise are used; so that the computations made of the quantity of air consumed by a human creature in a minute, must be very vague and variable. This was evident in M. Saussure's journey to the top of mount Blanc, where, besides the general rarefaction of the atmosphere, there was a great mixture of fixed air, as appeared by the precipitation of lime-water when exposed to the action of the common air. Here, though always somewhat uneasy, yet he was comparatively well while he remained in a state of inaction; but felt excessive trouble on being obliged to exert his strength, insomuch that he could scarce accomplish in four hours and an half, the experiments which at the foot of the mountain he would have easily done in three. "While I remained perfectly still (says he), I experienced but little uneasiness, more than a slight oppression about the heart; but on the smallest bodily exertion, or when I fixed my attention upon any object for some moments together, particularly when I pressed my chest in the act of stooping, I was obliged to rest and pant for some minutes."

From this account we must naturally conclude, that in cases where the powers of life and circulation are strong and vigorous, a great quantity of vital principle is requisite to support life; and the sudden deprivation of any considerable part of it may occasion death, even though

Of the quantity of vital air requisite for the support of human life in different situations.

Fixed Air. though as much still remain as would be sufficient to support life in other circumstances. Hence, if a strong and healthy animal is suddenly plunged into an atmosphere loaded with mephitic or other noxious vapours, it will very frequently die in a moment; while the mere circumstances of debility causes others to bear the same situation with impunity. In these circumstances a sudden exposure to very pure air might even be fatal to an animal very long confined in such as is noxious, just as fire may be put out by too violent a blast of air. Hence we may understand why consumptive persons are not recovered, but often made manifestly worse by being brought into purer air; and in all probability the death of Travis was hastened by his sudden removal into the open atmosphere. His remaining alive, therefore for such a length of time in circumstances so very unfavourable, we are to attribute in a particular manner to the extreme debility of the vital powers, by which an exceedingly small quantity of dephlogisticated air was required to support them. We are besides to take into consideration, that in certain cases the air will impart nourishment, even to the bodies of animals as well as vegetables. Under the article **ABSTINENCE**, instances are brought of animal bodies being augmented in bulk without any nourishment taken in by the mouth. In such cases we must conclude that the nourishment came from the phlogistic particles dispersed through it. It is not impossible therefore, that in some cases the human body, by absorbing from the atmosphere the phlogiston which it had just emitted by respiration, may purify the air which it had just before contaminated; and thus life might be prolonged in the case of Travis, who was not only destitute of air proper for respiration, but of food and drink also. In cases of famine, it is manifest that there is a great absorption from the atmosphere. Thus a negroe who was gibbeted at Charlestown, and had nothing given him afterwards, voided a large quantity of urine every morning; and in cases of lenteria and diabetes, the quantity of evacuations greatly exceeds the nourishment taken in by the mouth. On this principle perhaps we may account for that very strange phenomenon of animals being found alive in the heart of solid bodies, where there could be no possibility of any connection with the external atmosphere. Instances of these are given under the article. **ANIMALCULE**, n^o 57.

9
Why sudden changes from noxious to pure air are dangerous.

10
The human body may sometimes absorb nourishment from the atmosphere.

11
Effects of fixed air on vegetation.

We shall conclude this part of our subject with some observations made by Mr Henry on the effects of fixed air on vegetation. Experiments on this subject had been made first by Dr Priestley, and afterwards by Dr Percival, but with very different results; the former concluding that fixed air was prejudicial to the growth of vegetables, and Dr Percival that it was favourable to it. Mr Henry endeavours to reconcile the difference. He supposes Dr Percival's meaning to be, not that fixed air, in its pure state and stagnant, was favourable to vegetables immersed in it; but that gradually applied, and in a continued stream, while the plants at the same time are not confined from the common air, do receive from fixed air such a proportion of nourishment as is sufficient for their temporary support, even when removed from every other means of being supplied with food.

Dr Priestley, in his third volume on Air, acknow-

ledges the fairness and candour with which the experiments of Dr Percival were related, but supposes there must have been some mistake; particularly, as the air was produced by Dr Nooth's apparatus, he thinks the quantity could not be so great as was imagined. In support of this opinion he mentioned a great number of experiments, in which fixed air was tried in all proportions, from a state of purity to a mixture of one-third of fixed air with seven-eighths of common air; and in all these the fixed air was found to be injurious, and to destroy the colour of rose-leaves.

Fixed Air.

From some experiments made by Mr Henry himself the contrary opinion seemed to be established. By these it appeared that a strawberry plant had not only been preserved alive, exposed in the middle of Dr Nooth's machine to copious streams of fixed air, from the 23d of April to the 14th of May, but that the blossoms, which were only budded when put into the machine, had actually expanded; a strong proof that the plant had continued to vegetate. It was still alive, but in a situation somewhat drooping; and happening to be crushed on taking it out of the apparatus, it was thrown away altogether. Two sprigs of mint, with some earth loosely adhering to their roots, were subjected to a similar experiment from the 1st to the 12th of September; the one having a continual current of fixed air applied to it, but the other being left to the operation of common atmospherical air. The roots of both were cut off on the 7th: that in common air exhibited symptoms of decay on the 12th; but the other continued fresh for more than a week after the other had been decayed almost to the top.

On the 11th of April 1777, the weather being very cold and backward, Mr Henry filled the middle part of Dr Nooth's machine entirely with fixed air, by first filling it with water, inverting it in the same fluid, stopping up the capillary tubes, and then driving out the water from the vessel by a stream of fixed air from an effervescing mixture. The middle was then immediately placed in the lower part of the machine, containing an effervescing mixture also, which had been working for several minutes; and a crimson polyanthus was introduced into the middle part, and suspended by a string. In passing through the mouth of the vessel, the petals were compressed, and one or two received some damage. A young sprig of mint, with its root, was introduced the same day, and into the same vessel; while a similar sprig, as a standard, was placed in a large glass decanter. The polyanthus began to droop on the 15th, and was taken out next day shrivelled but not discoloured. The mint, when examined on the 12th, was apparently more fresh than when first put into the vessel with fixed air; the next day two young shoots appeared still more vigorous. On the 15th its appearance was more vivid than that in common air; but next day it was taken out quite dead. This sudden change, however, our author supposes to have been owing to the machine having no valve; and having been violently shaken, he suspected that some of the vitriolic acid had been forced up through the tubes; for the moisture on the inside of the middle part was found to be more acid than it should have been by fixed air alone.

The experiment was repeated on the 26th of April with a polyanthus plant with its root and flowers, which,

Fixed Air. which, with several others, were put into the middle part of Nooth's machine. Here it continued till the 10th of May. The effervescence was frequently renewed; for the first four days twice, and then once a-day; but the discharge of air was continually going on. It continued ten days without any signs of decay: and when taken out of the machine on the 14th day though some of the older flowers were fading, the others were as fresh and blooming as when put into the vessel; more so than those which had been purchased on the same day, and planted in the garden. The body of the plant was green, succulent, and undecayed. The air extinguished flame. On trial it was found to be one-third fixed air; and during several days, the proportion of fixed air must have been larger.

But, when *confined* in vessels of fixed air, or even in Nooth's machine, with the upper part and grooved stopper put on, plants died sooner than in common air. The air measured was seven-eighths fixed air.

12
Phlogiston!
the food of
plants.

"I am informed (says Mr Henry), that an ingenious philosopher of Geneva has made some experiments, by which he has proved, not only that phlogiston is the food of plants, but also, to the satisfaction of Dr Priestley, that it is in the form of fixed air, in proper proportion and place, that this pabulum is administered. In regard to the animal body, it would surely be wrong to say that nothing was nutritious or salutary to it which it could not bear to receive unmixed or undiluted. Why then may we not suppose, that though fixed air, when pure, may be fatal to plants confined in it, and excluded from communication with the external air; yet, when applied in a proper dose, and to plants enjoying a free intercourse with the atmosphere, it may have a contrary effect, and serve to nourish and support them? But in Dr Priestley's experiments, this free intercourse does not appear to have been allowed; and herein, I apprehend, consisted the cause of the difference in our results.

"At that time the constitution of fixed air was not understood. It is now generally allowed to be formed by a combination of phlogiston with the pure part of atmospheric air. The first of these ingredients has been proved by Dr Priestley and others to be favourable to vegetation; while plants droop and decay when exposed to the action of the latter. It should further appear from Dr Ingenhousz's experiments, that plants have the power of separating phlogiston from common air, applying it to their nurture (A), and throwing out the pure or dephlogisticated residuum as excrementitious. Now allowing, what is highly probable, that they have a similar power of decomposing fixed air, and of applying and rejecting its constituent parts, our method of conducting the experiments was not injurious to the process; whereas, when confined in close vessels, as by Dr Priestley, the plants would be suffocated in a manner reversed to what would happen to an animal. For as in that case, from a want of communication with the atmosphere, as necessary to carry off the phlogistic air from the lungs (according to the beautiful theory of respiration advanced and so well supported by Dr Priestley), the animal must perish; so, in the other instance, the plant would die if cut off from the air of the atmosphere in such a manner that the pure air ex-

2

creted by its vessels would not be conveyed from it. For in these circumstances, this fluid, so salutary to animal but destructive to vegetable life, must be accumulated in the body of the plant: and its functions being thus impeded, death is the necessary consequence."

As fixed air is now an article of the materia medica, a method of obtaining it readily and in large quantity becomes an object of considerable consequence. Mr Henry, who has proved that fixed air is the proper base of ferments, and the immediate cause of fermentation †, describes an apparatus for impregnating wort or other fermentable liquors with it. This apparatus is represented Plate CXCIII.

A A. Fig. 1. represents the cask in which the wort is to be impregnated; dd, the strings by which the air vessel is to be let down.

Fig. 2. DD, The air vessel, similar to the bottom part of Nooth's glass machine, to be made of glass or earthen ware. cc, A glass-stopper ground in to fit the mouth of the vessel, having a number of capillary tubes running from bottom to top in a diverging direction, so as to spread the air in its passage through the liquor.

Fig. 3. The stopper viewed separately to show the capillary tubes.

The method of using this apparatus is obvious from an inspection of the figure; but at the same time it must be equally evident, that it cannot be applied where any very large quantity is to be impregnated. Where great quantities of fixed air are required, we must also use great quantities of fermenting materials; and it would be inconvenient in the highest degree to immerge these in the liquor to be fermented; not to mention, that where large quantities of this kind of materials are mixed, they ought frequently to be stirred or shaken, lest they should concrete into hard lumps; while at the same time they are often apt to swell, and would thus endanger the spoiling of the liquor altogether. It must also be remarked, that any liquid receives an impregnation of fixed air more readily from the surface than by blowing it through the mass of liquid. The apparatus represented fig. 4. therefore seems preferable to that of Mr Henry, as capable of being extended infinitely almost without any additional trouble. ABCD represents a large wooden cask filled with materials to the height presented by kk. E is a large flat cooler for holding the liquor to be impregnated. This vessel is to be closely covered, and may be conveniently made of lead, having a wooden top, the edges of which are closely luted all round with a mixture of salad oil and finely powdered chalk. f, Represents a tin pipe, about an inch in diameter, by which a communication is made between the cask and cooler for the transmission of the fixed air. gh, Is a wooden axis passing quite through the cask from top to bottom, and moveable on a centre h, having a strong handle at top, to turn it in order to stir the mixture. iii, Are four cross blades fixed into the axis, which, in consequence of turning the handle, stir and raise a great commotion in the liquor contained in the cask. m, Is a large hole stopped with a wooden plug, by which the materials may be put in or taken out; and for this last purpose a kind of ladle with an upright stem

Fixed Air.

13
Methods of
impregna-
ting water
or other li-
quors in
large quan-
tities with
fixed air.

† See Fer-
mentation.

(A) See this further discussed under the article AEROLOGY, n^o 51, 52.

Fire-Ship.

Plate CXCI.

Fire Place.

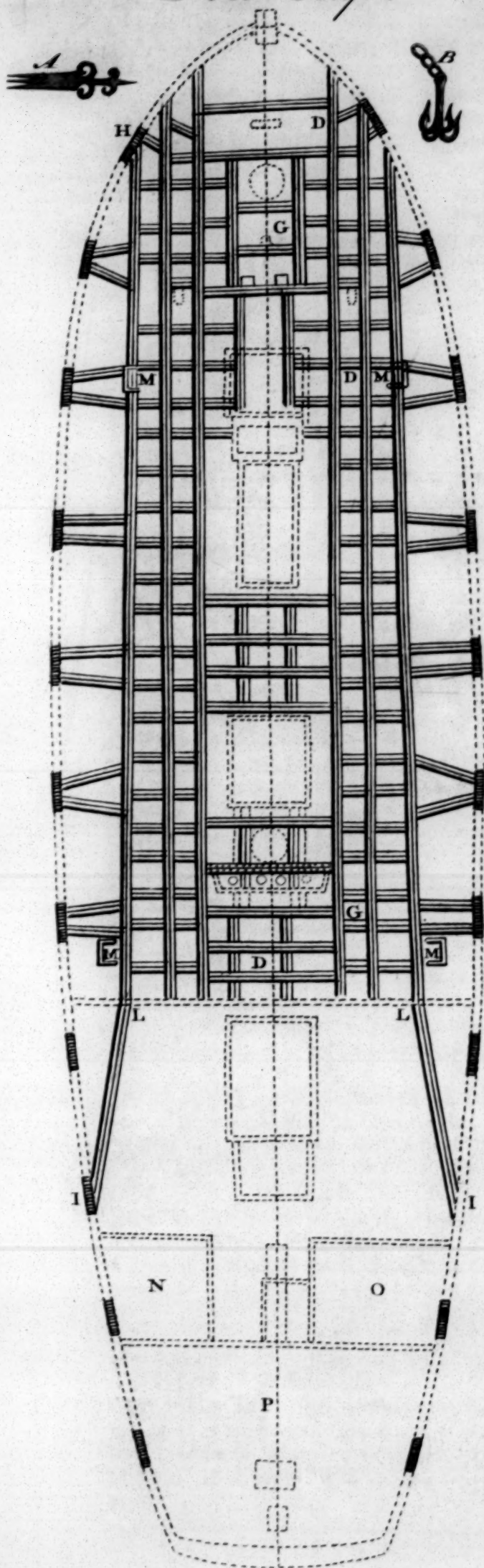


Fig. 1.

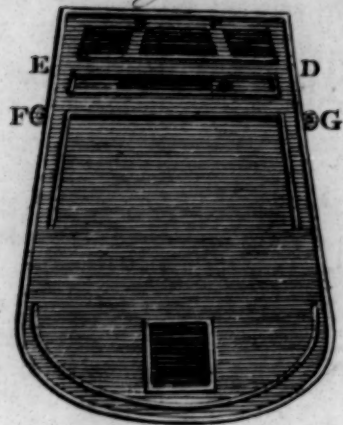


Fig. 2.

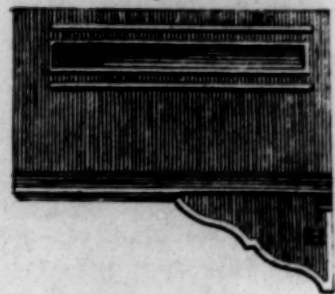


Fig. 4.

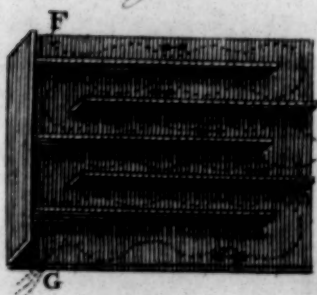


Fig. 3.

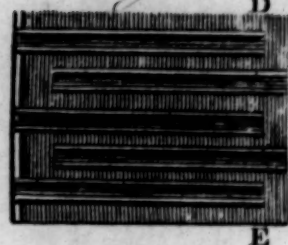
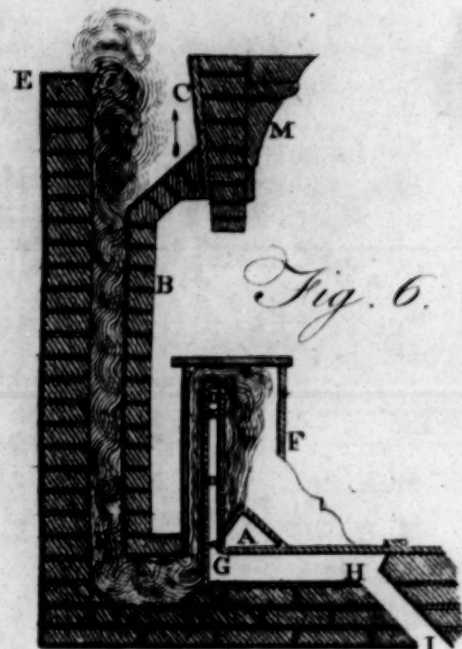


Fig. 5.



Fig. 6.



Fixed-Air.

Fig. 1.



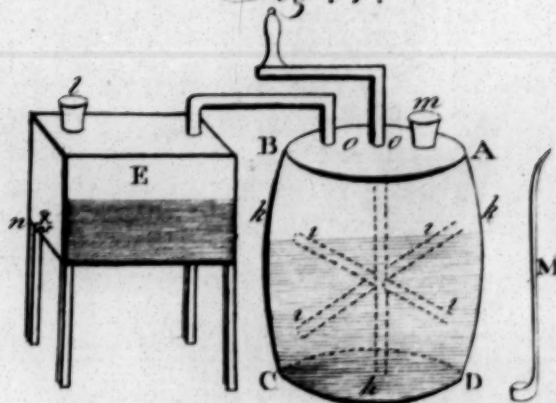
Fig. 3.



Fig. 2.



Fig. 4.





Fixed Stars stem as *M* may be made use of. *I*, Is a plug stopping up a hole in the lid of the cooler *E*, by which the liquor to be impregnated may be put in, and let out again by the cock *n*.

||
Flags.

In this apparatus it is evident, that when an effervescing mixture is put into a cask, the fixed air must pass through the tube *f* into the cooler, where it will be absorbed by the liquor as fast as it is emitted by the materials; but in order to prevent it from escaping, all the junctures must be luted carefully with the mixture of salad oil and chalk already mentioned, which is both sufficiently adhesive, and remaining soft for a long time, may be instantaneously repaired where it happens to be broken. When the effervescence begins to turn languid, it may instantly be quickened by turning the handle; but this will disturb the luting at *o o*, which must therefore be clapped close all round the axis as soon as the matter is sufficiently stirred.

* See *Astronomy*,
n° 192.

FIXED Stars, are such as constantly retain the same position and distance with respect to each other*; by which they are contradistinguished from *erratic* or *wandering* stars, which are continually shifting their situation and distance.—The fixed stars are what we properly and absolutely call *stars*: the rest have their peculiar denominations of *planet* and *comet*. See **ASTRONOMY**, per *Index*.

FIXITY, or **FIXEDNESS**, in chemistry, is in a peculiar manner used for the affection opposite to volatility; *i. e.* the property whereby bodies bear the action of the fire, without being dissipated in fumes.

FLACCUS (Caius Valerius), an ancient Latin poet, of whom we have very imperfect accounts remaining. He wrote a poem on the Argonautic expedition; of which, however, he did not live to finish the eighth book, dying at about 30 years of age. John Baptista Pius, an Italian poet, completed the eighth book of the Argonautics; and added two more from the fourth of Apollonius; which supplement was first added to Aldus's edition in 1523.

FLAGS, in the army, are small banners of distinction stuck in the baggage-waggons, to distinguish the baggage of one brigade from another, and of one battalion from another; that they may be marshalled by the waggon-master-general according to the rank of their brigades, to avoid the confusion that might otherwise arise.

FLAG, in the marine, a certain banner or standard, by which an admiral is distinguished at sea from the inferior ships of his squadron; also the colours by which one nation is distinguished from another. See **PLATE CXCIV**.

In the British navy, flags are either red, white, or blue; and are displayed from the top of the main-mast, fore-mast, or mizen-mast, according to the rank of the admiral. When a flag is displayed from the flag-staff on the main-mast, the officer distinguished thereby is known to be an admiral; when from the fore-mast, a vice-admiral; and when from the mizen-mast, a rear-admiral.

The first flag in Great-Britain is the royal standard, which is only to be hoisted when the king or queen are on board the vessel: the second is that of the anchor of hope, which characterises the lord high admiral, or lords commissioners of the admiralty: and the third is the union-flag, in which the crosses of St George and

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St Andrew are blended. This last is appropriated to the admiral of the fleet, who is the first military officer under the lord high admiral.

Flags,
Flagellantes.

The next flag after the union is that of the white squadron, at the main-mast head; and the last, which characterises an admiral, is the blue, at the same mast-head.

For a vice-admiral, the first flag is the red, the second the white, the third the blue, at the flag-staff on the fore-mast.

The same order proceeds with regard to the rear-admirals, whose flags are hoisted on the top of the mizen-mast: the lowest flag in the English navy is accordingly the blue on the mizen-mast.

To Lower or Strike the FLAG, in the marine, is to pull it down upon the cap, or to take it in, out of the respect, or submission, due from all ships or fleets inferior to those any way justly their superiors. To lower or strike the flag in an engagement, is a sign of yielding.

The way of leading a ship in triumph is to tie the flags to the shrouds, or the gallery, in the hind-part of the ship, and let them hang down towards the water, and to tow the vessels by the stern. Livy relates, that this was the way the Romans used those of Carthage.

To Heave out the FLAG, is to put out or put abroad the flag.

To hang out the White FLAG, is to ask quarter; or it shows, when a vessel is arrived on a coast, that it has no hostile intention, but comes to trade, or the like. The red flag is a sign of defiance, and battle.

FLAG is also used for sedge, a kind of rush.

Corn-FLAG. See **GLADIOLUS**.

Sweet-scented FLAG. See **ACORUS**.

FLAG-Officers, those who command the several squadrons of a fleet; such are the admirals, vice-admirals, and rear-admirals.

The British flag-officers are, the admiral, vice-admiral, and rear-admiral, of the white, red, and blue. See **ADMIRAL**, **FLAG**, and **FLEET**.

FLAG-Ship, a ship commanded by a general or flag-officer, who has a right to carry a flag, in contradistinction to the secondary vessels under the command thereof.

FLAG-Stone, a genus of argillaceous earths, of a grey, yellowish, or reddish-white colour; not giving fire with steel, nor effervescing with acids. Its specific gravity is from 2600 to 2780. Sometimes it is found compact, and sometimes like the argillaceous grit; in which case its gravity is less. Its general use is for flooring houses, though sometimes it is made use of for covering them. There is also a calcareous flag-stone, found near Woodstock in England. It is of a yellowish-white colour, and moderately hard, containing a little iron. Its specific gravity is 2585.

FLAGELLANTES, a sect of wild fanatics who chastised and disciplined themselves with whips in public.

The sect of the Flagellantes had its rise in Italy in the year 1260; its author was one Rainier a hermit; and it was propagated from hence through almost all the countries of Europe. It was in all probability no more than the effect of an indiscreet zeal. A great number of persons of all ages and sexes made processions,

N n

Flagellantes
Flake.

sions, walking two by two with their shoulders bare, which they whipped till the blood ran down, in order to obtain mercy from God, and appease his indignation against the wickedness of the age. They were then called the *devout*; and having established a superior, he was called the *general of the devotion*. Though the primitive Flagellantes were exemplary in point of morals, yet they were joined by a turbulent rabble, who were infected with the most ridiculous and impious opinions; so that the emperors and pontiffs thought proper to put an end to this religious phrensy, by declaring all devout whipping contrary to the divine law, and prejudicial to the soul's eternal interest.

However, this sect revived in Germany towards the middle of the next century, and rambling through many provinces, occasioned great disturbances. They held, among other things, that flagellation was of equal virtue with baptism and the other sacraments; that the forgiveness of all sins was to be obtained by it from God without the merits of Jesus Christ; that the old law of Christ was soon to be abolished, and that a new law enjoining the baptism of blood to be administered by whipping, was to be substituted in its place; upon which Clement VII. by an injudicious as well as unrighteous policy, thundered out anathemas against the Flagellantes, who were burnt by the inquisitors in several places; but they were not easily extirpated. They appeared again in Thuringia and Lower Saxony in the 15th century; and rejected not only the sacraments, but every branch of external worship; and placed their only hopes of salvation in faith and flagellation, to which they added other strange doctrines concerning evil spirits. Their leader Conrad Schmidt and many others were committed to the flames by German inquisitors in and after the year 1414.

FLAGEOLETS, or FLAJOLET, a little flute, used chiefly by shepherds and country-people. It is made of box or other hard wood, and sometimes of ivory; and has six holes besides that at the bottom, the mouth-piece, and that behind the neck.

FLAIL, an instrument for threshing corn. It consists of the following parts. 1. The hand-staff, or piece held in the thresher's hand. 2. The swiple, or that part which strikes out the corn. 3. The caplins, or strong double leathers, made fast to the tops of the hand-staff and swiple. 4. The middle-band, being the leather thong or fish-skin that ties the caplins together.

FLAIR, in sea-language. The seamen say that the work doth flair over, when a ship being housed in near the water, so that the work hangs over a little too much, and thus is let out broader aloft than the due proportion will allow.

FLAKE, in the cod-fishery, a sort of scaffold or platform, made of hurdles, and supported by stanchions, and used for drying cod-fish in Newfoundland. These flakes are usually placed near the shores of fishing-harbours.

FLAKE, in gardening, a name given by the florists to a sort of carnations which are of two colours only, and have very large stripes, all of them going quite through the leaves.

White-FLAKE, in painting, is lead corroded by means of the pressing of grapes, or a cerufs prepared by the acid of grapes. It is brought here from Italy; and far surpasses, both with regard to the purity of its

whiteness and the certainty of its standing, all the cerufs or white lead made with us in common. It is used in oil and varnish painting for all purposes where a very clean white is required. The white flake should be procured in lumps as it is brought over, and levigated by those who use it; because that which the colourmen sell in a prepared state is levigated and mixed up with starch, and often with white lead, and worse sophistications.

FLAMBEAU, or FLAMBOY, a luminary made of several thick wicks, covered over with wax, serving to burn at nights in the streets; as also at funeral processions, illuminations, &c.

Flambeaux differ from links, torches, and tapers.—They are made square, sometimes of white wax, and sometimes of yellow. They usually consist of four wicks or branches near an inch thick, and about three feet long, made of a sort of coarse hempen yarn half twisted. They are made with the ladle much as torches or tapers are; viz. by first pouring the melted wax on the top of the several suspended wicks, and letting it run down to the bottom. This they repeat twice. After each wick has thus got its proper cover of wax, they lay them to dry; then roll them on a table, and so join four of them together by means of a red-hot iron. When joined, they pour on more wax till the flambeau is brought to the size required, which is usually from a pound and half to three pounds. The last thing is to finish their form or outside, which they do with a kind of polishing instrument of wood by running it along all the angles formed by the union of the branches.

The flambeaux of the ancients were different from ours. They were made of woods dried in furnaces or otherwise. They used divers kinds of wood for this purpose; the wood most usual was pine. Pliny says, that in his time they frequently also burnt oak, elm, and hazle. In the seventh book of the *Æneid*, mention is made of a flambeau of pine; and Servius on that passage remarks, that they also made them of the cornel-tree.

FLAMBOROUGH HEAD, in geography, a cape or promontory on the eastern coast of Yorkshire, five miles east of Burlington, and 216 from London. E. Long. 2°. N. Lat. 54. 15.—This was the *Fleam-burg* of the Saxons; so called, as some think, from the lights made on it to direct the landing of Ida, who in 547 joined his countrymen in these parts with a large reinforcement from Germany, and founded the kingdom of Northumberland. In the time of Edward the Confessor, Flamborough was one of the manors of Harold, earl of the West-Saxons, afterwards king of England. On his death, the Conqueror gave it to Hugh Lupus; who, in perpetual alms, bestowed it on the monastery of Whitby.—The town is on the north side; and consists of about 150 small houses, entirely inhabited by fishermen; few of whom, as is said, die in their beds, but meet their fate in the element they are so conversant in. The cliffs of the Head are of a tremendous height and amazing grandeur. Beneath are several vast caverns; some closed at the end; others pervious, formed with a natural arch. In some places the rocks are insulated, and of a pyramidal figure, soaring up to a vast height. The bases of most are solid, but in some pierced through and arched. The colour

Flambeau,
Flambo-
rough-
Head.

Flame.

colour of all these rocks is white, from the dung of the innumerable flocks of migratory birds, which quite cover the face of them, filling every little projection, every hole that will give them leave to rest.

FLAME, is a general name for every kind of luminous vapour, provided the light it emits hath any considerable degree of intensity. The name *flame*, however is most generally applied to such as are of a conical figure, like those arising from our common fires; without this they are commonly called *luminous vapours*, or simply *lights*.

According to Sir Isaac Newton, flame is only *red-hot smoke*, or the vapours of any substance raised from it by fire, and heated to such a degree as to emit light copiously. This definition seems to be the most accurate and expressive of any. It is certain that bodies are capable of emitting flame only in proportion to the quantity of vapour that rises from them. Thus wood, coals, &c. which emit a great quantity of vapour, flame violently; while lead, tin, &c. which emit but a small fume, can scarce be perceived to flame at all.

This rule, is however by no means to be depended upon in all cases. Some vapours *seem* to be in their own nature unflammable, and capable of extinguishing flame: as those of water, the mineral acids, sal-ammoniac, arsenic, &c.: while others take fire on the slightest approach of a flaming substance; such as ether, spirit of wine, &c. These last mentioned substances, also exhibit a remarkable phenomenon; namely, that they cannot be made to flame without the approach of some substance actually in flames beforehand. Thus, spirit of wine poured on a red-hot iron, though instantly dissipated in vapour, will not flame; but if a burning candle touches its surface, the whole is set in a flame at once. The case is otherwise with oils, especially those of the grosser kind; for their vapours will readily be changed into flame by the mere increase of heat, without the approach of any flaming substance.

There is, however, no kind of vapour, perhaps, that is incapable of being converted into flame, provided it is exposed to a sufficient degree of heat. Thus the vapour of water made to pass through burning coals produces an exceedingly strong and bright flame.—It is remarkable that this kind of vapour seems to be more powerful than almost any other in absorbing heat, and detaining it in a latent state. Dr Black hath shown that when any quantity of aqueous vapour is condensed, more heat will be separated from it than would have been sufficient to heat an equal bulk of iron red hot.—It is most probably to this property which all vapours have of absorbing heat, and detaining it in a latent state, that we are to attribute the phenomena of flame, and also the exceeding great elasticity of steam. It is certain, that vapours, of water at least, have a much greater power of absorbing and retaining heat, than the water from which they are raised. In open vessels, water cannot be heated more than 212 degrees of Fahrenheit's thermometer; but in Papin's digester, where the vapour is forcibly confined, it has been heated to 400 of the same degrees; and, no doubt, might have been heated a great deal more, had the vessels been strong enough to bear the expansive force of the steam. On opening the vessels, however, the access of heat was found to have resided entirely in the vapour;

for the water in the vessel very soon sunk down to 212°, while the steam issued forth with great violence.

From these experiments it appears that the steam of water, after it has absorbed as much heat in a latent state as it can contain, continues to absorb, or detain among its particles, an unlimited quantity of sensible heat; and if the steam could be confined till this quantity became great enough to be visible by its emission of light, there cannot be the least doubt that the vapour would then be converted into flame.

In what manner the heat is detained among the particles of steam, is perhaps impossible to be explained; but to this heat we must undoubtedly ascribe the violent expansive force of steam of every kind. It seems probable that when smoke is converted into flame, the latent heat with which the vapour had combined, or rather that which made an essential part of it, breaks forth, and adds to the quantity of sensible heat which is already present. This seems probable, from the sudden explosion with which all flames break out. If a vessel full of oil is set over the fire, a smoke or vapour begins to arise from it; which grows gradually thicker and thicker; and at last begins to shine in some places very near the surface of the oil, like an electric light, or sulphur just kindled. At this time the oil is very hot, as well as the steam which issues from it. But this last is continually giving off its sensible heat into the atmosphere; so that at the distance of an inch or two from the surface of the oil, the heat of the steam will not exceed 400 degrees of Fahrenheit, or perhaps may not be so much; but if a burning candle is held in the steam for a moment, the whole is immediately converted into flame, with something like an explosion; after which, the oil burns quietly until it is all consumed. The flame, as soon as it appears, is not only much hotter than the steam from whence it was produced, but even than the oil which lies below it. Whence, then, has this sudden and great increase of heat arisen? It could not be the *sensible* heat of the vapour, for that was greatly inferior; nor could it be communicated from the oil, for that could communicate no more than it had to itself. The candle, indeed, would communicate a quantity of heat to the vapour which touched its flame; but it is impossible that this quantity should extend permanently over a surface perhaps 100 times larger than the flame of the candle, in such a manner as to make every part of that surface equally hot with the flame of the candle itself; for this would be to suppose it to communicate 100 times more heat than really was in it. The heat therefore must have originally resided in the vapour itself: and as, in the freezing of water, its latent heat is extricated and becomes sensible, and the water thereupon loses its fluidity; so, in the accension of vapour, the latent heat breaks forth with a bright flash, and the vapour is then totally decomposed, and converted into soot, ashes, or water, according to the different nature of the substances which produce it, or according to the intensity of the heat.—Several other hypotheses have been invented to solve the phenomena of burning and flaming bodies; for an account of which, see the articles IGNITION, PHLOGISTON, &c.

Flames are of different colours, according to the substances from which they are produced. Thus, the

Flame.

Flamen flame of sulphur and spirit of wine is blue; the flame of nitre and zinc, of a bright white; that of copper, of a greenish blue, &c. These varieties afford an opportunity of making a number of agreeable representations in fire-works, which could not be done if the flame produced from every different substance was of the same colour. See PYROTECHNICS.

Flaminus

FLAMEN, in Roman antiquity, the name of an order of priests, instituted by Romulus, or Numa; authors not being agreed on this head.

They were originally only three. viz. the *Flamen Dialis*, *Flamen Martialis*, and *Flamen Quirinalis*. The *Flamen Dialis* was sacred to Jupiter, and a person of the highest consequence and authority in the state. He discharged several religious duties which properly belonged to the kings, and was honoured with many eminent privileges beyond all other officers, but was obliged to observe several superstitious restraints. The *Flamen Martialis* was sacred to Mars, and was ordained to inspect the rites of that god. The *Flamen Quirinalis* was sacred to, and superintended the rites of *Quirinus Romulus*. The *flamines* last mentioned, though of high authority, were much inferior to the *Flamen Dialis*. All three were chosen by the people, and consecrated by the *Pontifex Maximus*.—In latter times several priests of the same order and name were added to them, but inferior in power. The whole number at last amounted to 15: the three first of whom were senators, and called *Flamines majores*; the other 12, taken from among the people, being denominated *Flamines minores*.—Some authors tell us the Romans had a *Flamen* for every deity they worshipped. The greater *Flamines* wore the robe and edged with purple, like the great magistrates: had an ivory chair, and a seat in the senate. They wore a little band of thread about their heads, whence their name is said to be derived, *Quasi Filamines*. Wife of the *Flamen Dialis* was called *Flaminica*, and wore a flame coloured habit, on which was painted a thunder-bolt, and above her head-dress she had green oak boughs, to indicate that she belonged to Jupiter the thunderer, to whom the oak was sacred. The *Flamines* wore each of them a hat or cap called *Flammeum* or *Apex*.

FLAMINGO, in ornithology. See PHOENICOPTERUS.

FLAMINUS, or **FLAMINIUS**, (T. Q.) a celebrated Roman raised to the consulship in the year of Rome 554, though under the age of 30. He was trained in the art of war against Hannibal; and he showed himself capable in every respect to discharge with honour the great office with which he was entrusted. He was sent at the head of the Roman troops against Philip king of Macedonia, and in his expedition he met with uncommon success. The Greeks gradually declared themselves his firmest supporters; and he totally defeated Philip on the confines of Epirus, and made all Locris, Phocis, and Thessaly tributary to the Roman power. He granted peace to the conquered monarch, and proclaimed all Greece free and independent at the Isthmian games. This celebrated action procured the name of Patrons of Greece to the Romans, and insensibly paved their way to universal dominion. Flaminus behaved among them with the greatest policy; by his ready compliance to their national customs and prejudices, he gained uncommon popularity, and received the name of

father and deliverer of Greece. He was afterwards sent ambassador to king Prusias, who had given refuge to Hannibal; and there his prudence and artifice hastened out of the world a man who had long been the terror of the Romans. Flaminus was found dead in his bed, after a life spent in the greatest glory, in which he had imitated with success the virtues of his model Scipio.

FLAMINIUS, or **FLAMINIO**, (Mark Anthony), one of the best Latin poets in the 16th century, of Imola in Italy, son and grandson of very learned men. The pope had chosen him secretary to the council in 1545; but he refused that employment, because, favouring the new opinions; he would not employ his pen in an assembly where he knew these opinions were to be condemned.—He paraphrased 30 of the psalms in Latin verse, and also wrote notes on the psalms; and some letters and poems which are esteemed. He died at Rome in 1550.

FLAMSTED, a town of Herfordshire in England, 5 miles from St Alban's and Dunstable, stands on the river Verlam, and was of old called Verlamstede. The land hereabouts is a clay so thickly mixed with flints, that, after a shower nothing appears but a heap of stones; and yet it bears very good corn even in dry summers. This fertility is imputed to a warmth in the flint, which preserves it from cold in the winter; and to its closeness, which keeps it from the scorching rays of the sun in the summer. Edward VI. when an infant was brought hither for his health, and, it is said the beadstead he lay on, which is curiously wrought, is still preserved in the manor-house just by.

FLAMSTEED (John), an eminent English astronomer in the 17th century, born at Derby in 1646. He had early read a great deal of civil and ecclesiastical history; but happening to see John de Sacrobosco's book *de Sphæra*, this gave him a turn for astronomy, which study he afterwards prosecuted with great vigour. His father, finding him in correspondence with several learned men, advised him to go to London, that he might be personally acquainted with them. In 1674, he wrote an ephemeris, in which he showed the falsity of astrology; and gave a table of the moon's rising and setting, carefully calculated, together with the eclipses and appulses of the moon and planets to fixed stars. This fell into the hands of Sir Jonas More: for whom, at his request, he made a table of the moon's true southings. In 1674, Sir Jonas having informed him, that a true account of the tides would be highly acceptable to his majesty, he composed a small ephemeris for the king's use: and when Sir Jonas showed the king and duke of York our author's telescopes and micrometer, and recommended him strongly, he procured him a warrant to be king's astronomer, with the salary of L.100 per annum; on which occasion he was ordained. In 1675, the foundation of the royal observatory at Greenwich was laid, and during the building he lodged at Greenwich; his quadrant and telescopes being kept in the queen's house there. His *Doctrine of the Sphere* was published in 1681, in a posthumous work of Sir Jonas More, intitled, *A new System of the Mathematics*. In 1584, he was presented to the living of Burfrow in Surry, which he enjoyed till he died in 1719. His *Historia celestes Britannica* was published at London in 1725, in 3 vols. Mr Flamsteed likewise composed the British Catalogue of the

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the fixed stars, which contains twice the number that are in the catalogue of Hevelius: to each of which he annexed its longitude, latitude, right ascension, and distance from the pole, together with the variation of right ascension and declination, while the longitude increases a degree. This catalogue, together with most of his observations, were printed on a fine paper and character, at the expence of the late prince George of Denmark.

FLANDERS, a province of the Netherlands, bounded by the German sea and the United Provinces on the north, by the province of Brabant on the east, by Hainault and Artois on the south, and by another part of Artois and the German sea on the west; being about 60 miles long, and 50 broad, and divided between the Austrians, the French, and the Dutch.

Flanders is a perfectly champaign country, with not a rising ground or hill in it, and watered with many fine rivers and canals. Its chief commodities are fine lace, linen, and tapestry.

In this country some important arts were invented and improved. Weaving in general was greatly improved, and that of figures of all sorts in linen were invented; also the art of dyeing cloths and stuffs, and of oil-colours; the curing of herrings, &c. The manufactures of this country are not now in the flourishing state they were formerly; yet silk, cotton, and woollen stuffs, brocades, camblets, tapestry, lace, and linen, are still manufactured here in great quantities. This province had counts of its own from the ninth century to the year 1369, when it went by marriage to the dukes of Burgundy; and afterwards from them, by marriage also, to the house of Austria. France, in 1667, seized the southern part; and the States-General obtained the northern partly by the treaty of Munster, and partly by the barrier-treaty of 1715.

For a more particular history of Flanders, with a continuation down to the present times, see the article NETHERLANDS.

FLANEL, or FLANNEL, a kind of flight, loose, woollen stuff, composed of a woof and warp, and wove on a loom with two treddles, after the manner of bays.

Dr Black assigns as a reason why flannel and other substances of the kind keep our bodies warm, that they compose a rare and spongy mass, the fibres of which touch each other so slightly, that the heat moves slowly thro' the interstices, which being filled only with air, and that in a stagnant state, give little assistance in conducting the heat. Sir Benjamin Thomson has inquired farther into the matter, and finds that there is a relation betwixt the power which the substances usually worn as clothing have of absorbing moisture, and that of keeping our bodies warm. Having provided a quantity of each of these substances mentioned below, he exposed them, spread out upon clean China plates, for the space of 24 hours to the warm and dry air of a room which had been heated by a German stove for several months, and during the last six hours had raised the thermometer to 85° of Fahrenheit; after which he weighed equal quantities of the different substances with a very accurate balance. They were then spread out upon a China plate, and removed into a very large uninhabited room upon the second floor, where they were exposed 48 hours upon a table placed in the middle of

the room, the air of which was at 45° of Fahrenheit. At the end of this space they were weighed, and then removed into a damp cellar, and placed on a table in the middle of the vault, where the air was at the temperature of 45°, and which by the hygrometer seemed to be fully saturated with moisture. In this situation they were suffered to remain three days and three nights; the vault being all the time hung round with wet linen cloths, to render the air as completely damp as possible. At the end of three days they were weighed, and the weights at the different times were found as in the following table.

Flannel.

	Weight after being dried in the hot room.	Weight after coming out of the cold room.	Weight after remaining 72h. in the vault.
Sheeps wool		1084	1163
Beaver's fur		1072	1125
The fur of a Russian hare		1065	1115
Eeder down		1067	1112
Silk { Raw single thread	Parts 1000	1057	1107
{ Ravellings of white taffety		1054	1103
{ Fine lint		1046	1102
Linen { Ravellings of fine linen		1044	1082
Cotton wool		1043	1089
Ravellings of silver lace		1000	1000

On these experiments our author observes, that though linen, from the apparent ease with which it receives dampness from the atmosphere, seems to have a much greater attraction for water than any other; yet it would appear from what is related above, that those bodies which receive water in its unelastic form with the greatest ease, or are most easily wet, are not those which in all cases attract the moisture of the atmosphere with the greatest avidity. "Perhaps (says he), the apparent dampness of linen to the touch, arises more from the ease with which that substance parts with the water it contains, than from the quantity of water it actually holds: in the same manner as a body appears hot to the touch, in consequence of its parting freely with its heat; while another body, which is really at the same temperature, but with-holds its heat with great obstinacy, affects the sense of feeling much less violently. It is well known that woollen cloths, such as flannels, &c. worn next the skin, greatly promote insensible perspiration. May not this arise principally from the strong attraction which subsists between wool and the watery vapour which is continually issuing from the human body? That it does not depend entirely on the warmth of that covering, is clear; for the same degree of warmth produced by wearing more clothing of a different kind, does not produce the same effect. The perspiration of the human body being absorbed by a covering of flanel, it is immediately distributed through the whole thickness of that substance, and by that means exposed, by a very large surface, to be carried off by the atmosphere; and the loss of this watery vapour, which the flannel sustains on the one side by evaporation, being immediately restored from the other, in consequence of the strong attraction between the flannel and this vapour, the pores of the skin are disincumbered, and they are continually surrounded by a dry and salubrious atmosphere."

Our author expresses his surprise, that the custom of wearing

Flank
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Flatman.

wearing flannel next the skin should not have prevailed more universally. He is confident it would prevent a number of diseases; and he thinks there is no greater luxury than the comfortable sensation which arises from wearing it, especially after one is a little accustomed to it. "It is a mistaken notion (says he), that it is too warm a clothing for summer. I have worn it in the hottest climates, and at all seasons of the year; and never found the least inconvenience from it. It is the warm bath of a perspiration confined by a linen shirt, wet with sweat, which renders the summer heats of southern climates so insupportable; but flannel promotes perspiration, and favours its evaporation; and evaporation, as is well known, produces positive cold.

It has been observed that new flannel, after some time wearing, acquires the property of shining in the dark, but loses it on being washed. *Philos. Transf.* n° 483. § 7.

FLANK, or FLANC, in the manege, is applied to the sides of a horse's buttocks, &c. In a strict sense, the flanks of a horse are the extremes of the belly, where the ribs are wanting, and are below the loins.

The flanks of a horse should be full, and at the top of each a feather. The distance between the last rib and haunch bone, which is properly the flank, should be short, which they term *well coupled*, such horses being most hardy, and fit to endure labour.

A horse is said to have no flank if the last of the short ribs be at a considerable distance from the haunch-bone; as also when his ribs are too much straightened in their compass.

FLANK, in war, is used by way of analogy for the side of a battalion, army, &c. in contradistinction to the front and rear.

To attack the enemy in flank, is to discover and fire upon them on one side. See FILE.

FLANK, in fortification, is a line drawn from the extremity of the face towards the inside of the work.

Or, flank is that part of a bastion which reaches from the curtain to the face, and defends the opposite face, the flank, and the curtain. See FORTIFICATION.

FLAT, in sea-language, denotes a level ground lying at a small depth under the surface of the sea, and is called a *shoal* or *shallow*.

FLAT-bottomed Boats are such as are made to swim in shallow water, and to carry a great number of troops, artillery, ammunition, &c. They are constructed with a 12 pounder, bow-chase, and an 18 pounder, stern-chase; their keel is from 90 to 100 feet, and from 12 to 24 feet beam: they have one mast, a large square mainsail, and a jib-sail; are rowed by 18 or 20 oars, and can carry 400 men each. The gun takes up one bow, and a bridge the other over which the troops are to march. Those that carry horses have the fore-part of the boat made to open when the men are to mount and ride over a bridge.

FLATMAN (Thomas), an English poet of some repute, born at London about the year 1633. He studied at the Inner-Temple, and became a barrister, but it does not appear that he ever practised; for having a turn for the fine arts, he gave a loose to his inclination that way, and acquired reputation, both as a poet and a painter. He published, in 1682, a third edition of his poems and songs dedicated to the duke of Ormond, with a print of himself as a

frontispiece: he also published a satirical romance in prose, on Richard Cromwell, soon after the restoration; which took greatly at that turn of affairs. He died about 1688.

FLATS, in music. See INTERVAL.

FLATUS, FLATULENCE, in medicine; vapours generated in the stomach and intestines, chiefly occasioned by a weakness of these parts. They occasion distensions, uneasy sensation, and sickness, and often a considerable degree of pain. See (the *Index* subjoined to) MEDICINE.

FLAVEL (John), an eminent nonconformist minister, was educated at University-college, in Oxford: and became minister of Deptford, and afterwards of Dartmouth in Devonshire, where he resided the greatest part of his life, and was admired for his preaching. Though he was generally respected at Dartmouth; yet, in 1685, several of the aldermen of that town, attended by the rabble, carried about a ridiculous effigy of him, to which were affixed the Bill of Exclusion and the Covenant. Upon this occasion, he thought it prudent to withdraw from the town; not knowing what treatment he might meet with from a riotous mob, headed by magistrates who were themselves among the lowest of mankind. Part of his Diary, printed with his Remains, must give the reader a high idea of his piety. He died in 1691, aged 61; and after his death, his works, which consisted of many pieces of practical divinity, were printed in two volumes folio. Among these, the most famous are his "Navigation Spiritualized, or a New Compass for Seamen, consisting of 32 points of pleasant observations and serious reflections," of which there have been several editions in 8vo; and his "Husbandry Spiritualized, &c. with occasional meditations upon beasts, birds, trees, flowers, rivers and several other objects," of which also there have been many editions in octavo.

FLAX, in botany. See LINUM.

The following particulars with regard to the manner of raising flax, has been for some years past warmly recommended by the trustees for fisheries, manufactures, and improvements in Scotland.

Of the choice of the Soil, and preparing the Ground for FLAX. A skilful flax-raiser always prefers a free open deep loam, and all grounds that produced the preceding year a good crop of turnip, cabbage, potatoes, barley, or broad clover; or have been formerly laid down rich, and kept for some years in pasture.

A clay soil, the second or third crop after being limed, will answer well for flax; provided, if the ground be still stiff, that it be brought to a proper mould, by tilling after harvest, to expose it to the winter frosts.

All new grounds produce a strong crop of flax, and pretty free of weeds. When a great many mole-heaps appear upon new ground, it answers the better for flax after one tilling.

Flax-seed ought never to be sown on grounds that are either too wet or dry; but on such as retain a natural moisture: and such grounds as are inclined to weeds ought to be avoided, unless prepared by a careful summer-fallow.

If the lint-seed be sown early, and the flax not allowed to stand for seed, a crop of turnip may be got after the flax that very year; the second year a crop of

Flax
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Flax.

Flax. of bear or barley may be taken; and the third year, grafs-seeds are sometimes sown along with the lintseed. This is the method mostly practised in and about the counties of Lincoln and Somerset, where great quantities of flax and hemp are every year raised, and where these crops have long been capital articles. There, old ploughed grounds are never sowed with lintseed, unless the soil be very rich and clean. A certain worm, called in Scotland the *coup-worm*, abounds in new-broke up grounds, which greatly hurts every crop but flax. In small inclosures surrounded with trees or high hedges, the flax for want of free air, is subject to fall before it be ripe, and the droppings of rain and dew from the trees prevent the flax within the reach of the trees from growing to any perfection.

Of preceding crops, potatoes and hemp are the best preparation for flax. In the fens of Lincoln, upon proper ground of old tillage, they sow hemp, dunging well the first year; the second year hemp without dung; the third year flax without dung; and that same year, a crop of turnip eat on the ground by sheep; the fourth year, hemp with a large coat of dung; and so on for ever.

If the ground be free and open, it should be but once ploughed; and that as shallow as possible, not deeper than 2 $\frac{1}{2}$ inches. It should be laid flat, reduced to a fine garden mould by much harrowing, and all stones and fods should be carried off.

Except a little pidgeon's dung for cold or sour ground, no other dung should be used preparatory for flax; because it produces too many weeds, and throws up the flax thin and poor upon the stalk.

Before sowing, the bulky clods should be broken, or carried off the ground; and stones, quickenings, and every other thing that may hinder the growth of the flax, should be removed.

Of the choice of Lintseed. The brighter in colour, and heavier the seed is, so much the better; that which when bruised appears of a light or yellowish green, and fresh in the heart, oily and not dry, and smells and tastes sweet, and not fusty, may be depended upon.

Dutch seed of the preceding year's growth, for the most part, answers best; but it seldom succeeds if kept another year. It ripens sooner than any other foreign seed. Philadelphia-seed produces fine lint and few bolls, because sown thick, and answers best in wet cold soils. Riga-seed produces coarser lint, and the greatest quantity of seed. Scots-seed, when well winned and kept, and changed from one kind of soil to another, sometimes answers pretty well; but should be sown thick, as many of its grains are bad, and fail. It springs well, and its flax is sooner ripe than any other; but its produce afterwards is generally inferior to that from foreign seed.

A kind has been lately imported, called *mummel-seed*; which looks well, is short and plump, but seldom grows above eight inches, and on that account ought not to be sown.

Of Sowing Lintseed. The quantity of lintseed sown should be proportioned to the condition of the soil; for if the ground be in good heart, and the seed sown thick, the crop will be in danger of falling before it is ready for pulling. From 11 to 12 pecks Linlithgow measure of Dutch or Riga seed, is generally sufficient

for one Scots acre; and about ten pecks of Philadelphia seed, which, being the smallest grained, goes farthest. Riga lintseed, and the next year's produce of it, is preferred in Lincolnshire.

The time for sowing lintseed is from the middle of March to the end of April, as the ground and season answers; but the earlier the seed is sown, the less the crop interferes with the corn-harvest.

Late sown lintseed may grow long, but the flax upon the stalk will be thin and poor.

After sowing, the ground ought to be harrowed till the seed is well covered, and then (supposing the soil, as beforementioned, to be free and reduced to a fine mould) it ought to be rolled.

When a farmer sows a large quantity of lintseed, he may find it proper to sow a part earlier and part later, that in the future operations of weeding, pulling, watering, and grassing, the work may be the easier and more conveniently gone about.

It ought always to be sown on a dry bed.

Of Weeding FLAX. It ought to be weeded when the crop is about four inches long. If longer deferred, the weeders will so much break and crook the stalks, that they never perhaps will recover their straightness again; and when the flax grows crooked, it is more liable to be hurt in the rippling and swingling.

Quicken-grass should not be taken up; for, being strongly rooted, the pulling of it always loosens a deal of the lint.

If there is an appearance of a settled drought, it is better to defer the weeding, than by that operation to expose the tender roots of the flax to the drought.

How soon the weeds are got out, they ought to be carried off the field, instead of being laid in the furrows, where they often take root again, and at any rate obstruct the growth of the flax in the furrows.

Of Pulling FLAX. When the crop grows so short and branchy, as to appear more valuable for seed than flax, it ought not to be pulled before it be thoroughly ripe; but if it grows long and not branchy, the seed should be disregarded, and all the attention given to the flax. In the last case it ought to be pulled after the bloom has fallen, when the stalk begins to turn yellow, and before the leaves fall, and the bolls, turn hard and sharp-pointed.

When the stalk is small, and carries few bolls, the flax is fine; but the stalk of coarse flax is gross, rank, branching, and carries many bolls.

When the flax has fallen, and lies; such as lies ought to be immediately pulled, whether it has grown enough or not, as otherwise it will rot altogether.

When parts of the same field grow unequally, so that some parts are ready for pulling before other parts; only what is ready should be pulled, and the rest should be suffered to stand till ready.

The flax-raiser ought to be at pains to pull, and keep by itself, each different kind of lint which he finds in his field; what is both long and fine, by itself; what is both long and coarse, by itself; what is both short and fine, by itself; what is both short and coarse, by itself; and in like manner every other kind by itself that is of the same size and quality. If the different kinds be not thus kept separate, the flax must be much damaged in the watering and the other succeeding operations.

What

Flax.

What is commonly called *under growth* may be neglected as useless.

Few persons that have seen pulled flax, are ignorant of the method of laying it in handfuls across each other; which gives the flax sufficient air, and keeps the handfuls separate and ready for the rippler.

Of Stacking up FLAX during the Winter, and Winning the Seed. If the flax be more valuable than the seed, it ought by no means to be stacked up; for its own natural juice assists it greatly in the watering; whereas, if kept long unwatered, it loses that juice, and the harle adheres so much to the boon, that it requires longer time to water, and even the quality of the flax becomes thereby harsher and coarser. Besides, the flax stacked up over year, is in great danger from vermin and other accidents; the water in spring is not so soft and warm as in harvest: and near a year is thereby lost of the use of the lint: but if the flax be so short and branchy as to appear most valuable for seed, it ought, after pulling, to be stooked and dried upon the field, as is done with corn; then stacked up for winter, rippled in spring; and after sheeling, the seed should be well cleaned from bad seeds, &c.

Of Rippling FLAX. After pulling, if the flax is to be regarded more than the seed, it should be allowed to lie some hours upon the ground to dry a little, and so gain some firmness, to prevent the skin or harle, which is the flax, from rubbing off in the rippling; an operation which ought by no means to be neglected, as the bolls, if put into the water along with the flax, breed vermin there, and otherwise spoil the water. The bolls also prove very inconvenient in the grassing and breaking.

In Lincolnshire and Ireland, they think that rippling hurts the flax; and therefore, in place of rippling, they strike the bolls against a stone.

The handfuls for rippling should not be great, as that endangers the lint in the rippling comb.

After rippling, the flax-raiser will perceive, that he is able to assort each size and quality of the flax by itself more exactly than he could before.

Of Watering FLAX. A running stream wastes the lint, makes it white, and frequently carries it away. Lochs, by the great quantity and motion of the water, also waste and whiten the flax, though not so much as running streams. Both rivers and lochs water the flax quicker than canals.

But all flax ought to be watered in canals, which should be digged in clay ground if possible, as that soil retains the water best: but if a firm retentive soil cannot be got, the bottom or sides of the canal, or both the bottom and sides, may be lined with clay; or instead of lining the sides with clay, which might fall down, a ditch may be dug without the canal, and filled with clay, which will prevent both extraneous water from entering, and the water within from running off.

A canal of 40 feet long, six broad, and four deep, will generally water the growth of an acre of flax.

It ought be filled with fresh soft water from a river or brook, if possible two or three weeks before the flax is put in, and exposed all that time to the heat of the sun. The greater way the river or brook has run, the softer, and therefore the better, will the water be. Springs, or short-runs from hills, are too cold,

unless the water is allowed to stand long in the canal. Water from coal or iron is very bad for flax. A little of the powder of galls thrown into a glass of water, will immediately discover if it comes from minerals of that kind, by turning it into a dark colour, more or less tinged in proportion to the quantity of vitriol it contains.

The canal ought not to be under shade; which, besides keeping the sun from softening the water, might make part of the canal cooler than other parts, and so water the flax unequally.

The flax-raiser will observe, when the water is brought to a proper heat, that small plants will be rising quickly in it, numbers of small insects and reptiles will be generated there, and bubbles of air rising on the surface. If no such signs appear, the water must not be warm enough, or is otherwise unfit for flax.

Moss-holes, when neither too deep nor too shallow, frequently answer well for watering flax, when the water is proper, as before described.

The proper season for watering flax is from the end of July to the end of August.

The advantage of watering flax as soon as possible after pulling, has been already mentioned.

The flax being sorted after rippling, as before-mentioned, should next be put in beets, never larger than a man can grasp with both his hands, and tied very slack with a band of a few stalks. Dried rushes answer exceedingly well for binding flax, as they do not rot in the water, and may be dried and kept for use again.

The beets should be put into the canals stop-ways, or half standing upon end, the root-end uppermost. Upon the crop-ends, when uppermost, there frequently breeds a deal of vermin, destructive of the flax, which is effectually prevented by putting the crop-end downmost.

The whole flax in the canal ought to be carefully covered from the sun with divots; the grassy side of which should be next the flax, to keep it clean. If it is not thus covered, the sun will discolour the flax, though quite covered with water. If the divots are not weighty enough to keep the flax entirely under water, a few stones may be laid above them. But the flax should not be pressed to the bottom.

When the flax is sufficiently watered, it feels soft to the gripe, and the *harle* parts easily with the *boon* or *show*, which last is then become brittle, and looks whitish. When these signs are found, the flax should be taken out of the water, beet after beet; each gently rinsed in the water, to cleanse it of the nastiness which has gathered about it in the canal: and as the lint is then very tender, and the beet slackly tied, it must be carefully and gently handled.

Great care ought to be taken that no part be overdone, and as the coarsest waters soonest, if different kinds be mixed together, a part will be rotted, when the rest is not sufficiently watered.

When lint taken out of the canal is not found sufficiently watered, it may be laid in a heap for 12, 18, or 24 hours, which will have an effect like more watering; but this operation is nice, and may prove dangerous in unskilful hands.

After the flax is taken out of the canal, fresh lint should

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Flax. should not be put a second time into it, until the former water be run off, and the canal cleaned, and supplied with fresh water.

Of grassing FLAX. Short heath is the best field for grassing flax; as, when wet, it fastens to the heath, and is thereby prevented from being blown away by the wind. The heath also keeps it a little above the earth, and so exposes it the more equally to the weather. When such heath is not to be got, links or clean old lea-ground is the next best. Long-grass grounds should be avoided, as the grass growing thro' the lint frequently spots, tenders, or rots it; and grounds exposed to violent winds should also be avoided.

The flax, when taken out of the water, must be spread very thin upon the ground; and being then very tender, it must be gently handled. The thinner it is spread the better, as it is then the more equally exposed to the weather. But it ought never to be spread during a heavy shower, as that would wash and waste the harle too much, which is then excessively tender, but soon after becomes firm enough to bear the rains, which, with the open air and sunshine, cleans, softens, and purifies the harle to the degree wanted, and makes it blister from the boon. In short, after the flax has got a little firmness by being a few hours spread in dry weather, the more rain and sunshine it gets the better.

If there be little danger of high winds carrying off the flax, it will be much the better of being turned about once a-week. If it is not to be turned, it ought to be very thin spread. The spreading of flax and hemp requires a deal of ground, and enriches it greatly.

The skilful flax-raiser spreads his first row of flax at the end of the field opposite to the point from whence the most violent wind commonly comes, placing the root-ends foremost; he makes the root-ends of every other row over-lap the crop-ends of the former row three or four inches, and binds down the last row with a rope; by which means the wind does not easily get below the lint to blow it away: and as the crop-ends are seldom so fully watered as the root-ends, the afore-said overlapping has an effect like giving the crop-ends, more watering. Experience only can fully teach a person the signs of flax being sufficiently grassed: then it is of a clearer colour than formerly: the harle is blistered up, and easily parts with the boon, which is then become very brittle. The whole should be sufficiently grassed before any of it is lifted; for if a part be lifted sooner than the rest, that which remains is in great danger from the winds.

A dry day ought to be chosen for taking up the flax; and if there is no appearance of high wind, it should be loosed from the heath or grass, and left loose for some hours, to make it thoroughly dry.

As a great quantity of flax can scarcely be all equally watered and grassed, and as the different qualities will best appear at lifting the flax off the grass; therefore at that time each different kind should be gathered together, and kept by itself; that is, all of the same colour, length, and quality.

The smaller the beets lint is made up in, the better for drying, and the more convenient for stacking, housing, &c. and in making up these beets, as in every other operation upon flax, it is of great consequence that the lint be laid together as it grew, the root-ends together, and the crop-ends together.

Follows an estimate of the Expence, Produce, and Profit of a Scots Acre of FLAX,—supposing the season favourable, that no accidental losses happen, and that the farmer is neither unskilful nor negligent.

	<i>A medium crop.</i>	<i>A great crop.</i>	<i>An extra. crop.</i>
Ground-rent, labouring the ground, and leading the flax	L. 2 10 0	L. 3 10 0	L. 5 0 0
Lintseed from L. 2. to L. 4. per hogthead, the medium			
3s. 4d. per peck	1 16 8	1 10 0	1 6 8
	for 11 pecks.	for 9 pecks.	for 8 pecks.
Clodding and sowing	0 2 0	0 2 0	0 2 0
Weeding	0 12 0	0 8 0	nothing.
Pulling, rippling, putting in, and covering in the water	0 14 0	0 15 0	1 0 0
Taking out of the water, grassing, and stacking	0 8 0	0 12 0	0 18 0
Breaking and scutching, at 2s. per stone	3 0 0	4 0 0	6 0 0
	for 30 stones.	for 40 stones.	for 60 stones.
Total expence	L. 9 2 8	L. 10 17 0	L. 14 6 8
Produce, at 10s. per stone	L. 15 0 0	L. 20 0 0	L. 30 0 0
Lintseed sold for oil, at 1s. per peck	0 16 0	0 18 0	1 0 0
The chaff of the bolls is well worth the expence of drying the seed; as it is good food, when boiled and mixed with beer, for horses.			
Total produce	L. 15 16 0	L. 20 18 0	L. 31 0 0
Balance for profit	L. 6 14 4	L. 10 1 0	L. 16 13 4

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There is nothing stated here as expence of the canal in which the flax is watered ; because that varies much according to the conveniences people have for making it ; and a canal once made requires for after years only to be repaired and cleansed.

It is a certain fact, that the greater the crop is, the better is the quality of the same kind of flax.

The advantage of having both a crop of flax and a crop of turnip the same year—or of sowing grafs-seeds along with the lintseed—and of reducing the ground to a fine garden mould, free of weeds, ought to be attended to.

For Cambric and fine Lawn. The ground must be a rich light soil, rather sandy, but cannot be too rich.

It ought to be ploughed in September, or the beginning of October, first putting a little hot rotten dung upon it. In January it ought to have a second ploughing, after a hard frost ; and when ye intend to sow it, plough it a third time, or rather hoe it, reducing the clods very fine ; but make no furrows : the land must be made level like a garden : but never work the land when wet.

The seed should be sown the beginning of April, and about double the quantity that is generally sown by our farmers ; if the land be very rich, it will require rather more than double.

As soon as sown (if the weather be dry) it will be necessary to roll the ground.

The lint must be weeded very clean when about three inches high ; directly after which you must set forked sticks, of about one-and-half inch thick (which ought to be prepared before), every four or five feet, according to the length of the poles you are to lay upon them ; they should be well fixed in the ground, the forked part to receive the poles about six or seven inches above the lint ; each row of poles should be two, three, or four feet asunder, according to the length of the brushwood you are to lay upon them.

The poles ought to be from 10 to 15 feet long, and strong enough to support the brush across the poles ; take the longest brushwood you can get, the more branched the better, very thick, filling up the vacancies with smaller brush, and any of the branches that rise higher than 18 or 20 inches ought to be lopped off to make the brush lie as level as possible : any sort of brush will do except oak, as that tinges the lint.

Your lint must be pulled as soon as the seed is fully formed, which is a few days after it is out of the bloom, before the lint turn yellow.

It must be pulled above the brushwood, and every handful laid upon it as soon as possible : if it is fine weather, leave it four or five hours in that manner ; then carry it to a screen near a barn, to put it under cover in case of rain ; there it must be spread four or five days, and always put it in the barn at night, or when it appears to rain : the bundles must be opened in the barn, or made hollow, to prevent it from heating.

These operations must be performed until the lint is perfectly dry, and out of danger of heating ; taking care all the time to keep the roots as even as possible, and if possible keep it from rain or wet : if you cannot prevent it from being wet, it will be better to leave it on the grafs till dry ; because when once wet, the putting it under cover before dry will make it turn black ; a thing which must be prevented at all events.

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If any of the lint upon the border, or through the piece of ground, be coarser than another, it must be separated from the rest.

The utmost care must be taken to preserve the lint entire or unbroken ; for this reason they beat off the seed with a round mell or bittle.

The most proper ground is summer fallow, or after potatoes or lea ; if possible near a wood, to prevent the expence of carrying brush.

As soon as the seed is off, if you intend to water it that season, it must be tied in bundles about as large as you can grasp with your two hands.

The water proper for it, is a very small rivulet or soft spring free of any metallic ore ; taking care that no flood or foul water enters your pit ; which must be at least five feet deep, about nine or ten broad at the top, and seven or eight at the bottom ; the length will depend on the quantity of flax you have to water.—— A very small stripe of water, when clear, should always be running in and off from your pit when the lint is in it.

The pit ought to be made three or four months before it be used.

You must drive poles about four inches thick, with a hook inclining downwards, in this form 7, all along the sides of the pit, above five feet asunder. The hooks must be level with, or rather under, the surface of the water. A long pole, the whole length of the pit, must be fixed into these hooks on each side ; and cross poles put under that, to keep the lint under water ; but the cross poles are not used till the lint is put in. You must order it so, that all the lint should be three or four inches under water. You next bring your lint to the sides of the pit ; then put your sheaves head to head, causing each to overlap the other about one third, and take as many of these as make a bundle of two or two and a half feet broad, laying the one above the other till it is about four or four and a half feet high ; then you tie them together in the middle, and at each root-end : after this you wrap your bundle in straw, and lay it in the water, putting the thin or broad side undermost, taking care that none of your lint touch the earth ; after it is fully pressed under water, put in your cross poles to keep it under. The bundles ought to lie in the pit a foot separate from each other. This renders it easy to take out ; for, if the bundles entangle, they will be too heavy to raise.

The time of watering depends so much upon the weather, and softness or hardness of the water, that it is impossible to fix any certain time. This must be left to the skill of the farmer. If the flax be intended for spinning yarn soft and fit for cambric, it ought to be spread upon short grafs for four or five days before you put it in the water ; but if for lawns, lace, or thread, it is best to dry it outright. In either case, avoid as much as possible to let it get rain ; as much rain blanches and washes out the oil, which is necessary to preserve the strength.

The great property of this flax is to be fine and long. Thick sowing raises all plants fine and slender ; and when the ground is very rich, it forces them to a great length. Pulling green prevents that coarse hardness which flax has when let stand till it be full ripe, and gives it the fine silky property. The brushwood, when the flax springs up, catches it by the middle,

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die, prevents it from lying down and rotting; infallible consequences of sowing thick upon rich ground. It likewise keeps it straight, moist, and soft at the roots; and by keeping it warm, and shaded from the sun, greatly promotes its length. The keeping it from rain, heating, taking proper care of your water, preserves the colour, and prevents those bars in cloth so much complained of by bleachers.

FLAX-Dressing. For many ages it was the practice to separate the boon or core from the flax, which is the bark of the plant, by the following simple *hand methods*. First, for breaking the boon, the stalks in small parcels were beat with a mallet; or, more dexterously, the *break* (Plate CXCIV. fig. 1. and 2.) was used thus: The flax being held in the left-hand across the three *under-teeth* or *swords* of the break (*A*, fig. 1. and *a*, fig. 2.), the *upper-teeth* (*B*, fig. 1. and *b*, fig. 2.) were with the right hand quickly and often forced down upon the flax, which was artfully shifted and turned with the left hand. Next, for clearing the flax of the broken boon: the workman with his left-hand held the flax over the *stock* (fig. 3. and 4.), while with his right-hand he struck or threshed the flax with the *scutcher* (fig. 5.)

These methods of breaking and scutching the flax being slow and very laborious, a *water-mill* was invented in Scotland about 40 years ago; which, with some late improvements, makes great dispatch, and in skilful and careful hands gives satisfaction. It has been generally constructed to break the boon by three dented rollers, placed one above the other. The middle one of which, being forced quickly round, takes the other two along with it, and one end of the handfuls of the flax being by the workmen directed in between the upper and middle rollers, the flax is immediately drawn in by the rollers; a curved board or plate of tin behind the rollers directs the flax to return again between the middle and undermost rollers;—and thus the operation is repeated until the boon be sufficiently broke. Great weights of timber or stone at the ends of levers, press the upper and under rollers towards the middle one.

The scutching is next carried on by the mill in the following manner: Four arms, something like the hand-scutchers before described, project from a perpendicular axle; a box around the axle incloses these projecting scutchers; and this box is divided among the workmen, each having sufficient room to stand and handle his flax, which, through slits in the upper part and sides of the box, they hold in to the stroke of the scutchers; which, moving round horizontally, strike the flax across or at right angles, and so thresh out or clear it of the boon.

The breaking of the flax by *rollers* is scarcely subject to any objection, but that it is dangerous to workmen not sufficiently on their guard, who sometimes allow the rollers to take hold of their fingers, and thereby their whole arm is instantly drawn in: thus many have lost their arms. To avoid this danger, a break, upon the general principles of the hand-break before described, has been lately adapted to water-machinery, and used in place of rollers. The horizontal stroke of the scutchers was long thought too severe, and wasteful of the flax; but very careful ex-

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periments have discovered that the waste complained of must be charged to the unskilfulness or negligence of the workmen, as in good hands the mill carries away nothing but what, if not so scutched off, must be taken off in the heckling with more loss both of time and flax. But to obviate this objection of the violence of the *horizontal scutchers*, an imitation of hand-scutching has lately been applied to water. The scutchers then project from an horizontal axle, and move like the arms of a check-reel, striking the flax neither across nor perpendicularly down, but sloping in upon the parcel exactly as the flax is struck by the hand-scutcher. This sloping stroke is got by raising the scutching-stock some inches higher than the centre of the axle; and by raising or lowering the stock, over which the flax is held, or screwing it nearer to or farther from the scutchers, the workman can temper or humour the stroke almost as he pleases.

A lint-mill, with horizontal scutchers upon a perpendicular axle, requires a house of two stories, the rollers or break being placed in the ground story, and the scutchers in the loft above; but a mill with vertical scutchers on an horizontal axle, requires but one ground story for all the machinery.

Another method of breaking and scutching flax, more expeditious than the old hand-methods, and more gentle than water-mills, has also been lately invented in Scotland. It is much like the break and scutcher giving the sloping stroke last described, moved by the foot. The treddle is remarkably long, and the scutchers are fixed upon the rim of a fly-wheel. The foot-break is also assisted in its motion by a fly. These foot-machines are very useful where there are no water-mills, but they are far inferior to the mills in point of expedition.

The next operation that flax undergoes after scutching is heckling. The *heckle* (fig. 6.) is firmly fixed to a bench before the workman, who strikes the flax upon the teeth of the heckle, and draws it through the teeth. To persons unacquainted with that kind of work this may seem a very simple operation; but, in fact, it requires as much practice to acquire the slight of heckling well, and without wasting the flax, as any other operation in the whole manufacture of linen. They use coarser and wider toothed heckles, or finer, according to the quality of the flax; generally putting the flax through two heckles, a coarser one first, and next a fine one.

Flax for cambric and fine lawn, thread, and lace, is dressed in a manner somewhat different. It is not scutched so thoroughly as common flax; which from the scutch proceeds to the heckle, and from that to the spinner: whereas, this fine flax, after a rough scutching, is scraped and cleansed with a blunt knife upon the workman's knee covered with his leather-apron; from the knife it proceeds to the spinner, who, with a brush made for the purpose, straightens and dresses each parcel just before she begins to spin it.

The following observations, first published in the Gentleman's Magazine for June 1787, seem worthy of very particular attention, and may not therefore be improperly subjoined as a supplement to the present article.

Flax.

Of the watering of Flax by a new method, so as to shorten labour, to add probably to the strength of the flax, and to give it a much finer colour, which would render the operation of bleaching safer and less tedious.

"Though the following reflections have for their object an improvement in the very essential article of watering of flax, yet I must advertise the reader, that they are only theory, and must depend entirely for their truth and justification upon future experiments, skillfully and judiciously made. Should repeated trials prove the advantage of the new method proposed, we may venture to affirm, that it would be an improvement that would increase the national income in the agricultural branch many thousand pounds annually, would add greatly to the perfection of the linen manufacture, and over and above would suppress a very disagreeable nuisance, which the present method of watering flax occasions during some part of the summer in every flax-growing country.

"The intention of watering flax is my opinion, to make the boon more brittle or friable, and, by soaking, to dissolve that gluey kind of sap that makes the bark of plants and trees adhere in a small degree to the woody part. The bark of flax is called the *harle*; and when separated from the useless woody part, the *boon*, this harle itself is called flax. To effect this separation easily, the practice has long prevailed, of soaking the flax in water to a certain degree of fermentation, and afterwards drying it. For this soaking some prefer rivulets that have a small current, and others stagnant water in ponds and lakes. In both methods the water acts as in all other cases of infusion and maceration; after two or three weeks it extracts a great many juices of a very strong quality, which in ponds give the water an inky tinge and offensive smell; and in rivulets mix in the stream and kill the fish. Nay, if this maceration be too long continued, the extracted and fermented sap will completely kill the flax itself. For if, instead of two or three weeks, the new flax were to lie soaking in the water four or five months, I presume it would be good for nothing but to be thrown upon the dunghill; both harle and boon would in time be completely rotted; yet the harle or flax, when entirely freed from this sap, and manufactured into linen, or into ropes, might lie many months under water without being much damaged; as linen, it may be washed and steeped in scalding water twenty times without losing much of its strength; and as paper, it acquires a kind of incorruptibility.

"It appears then essential to the right management of new flax, to get rid of this pernicious vegetative sap, and to macerate the boon; but from the complaints made against both the methods of watering now in use, there is reason to think that there is still great room for improvement in that article. In rivulets, the vegetative sap, as it is dissolved, is carried off by the current, to the destruction of the fish. This prevents the flax from being stained; but the operation is tedious, and not complete, from the uncertainty of knowing when it is just enough, and not too much, or perhaps from neglect. In ponds, the inky tinge of the water often serves as a kind of dye to the flax, which imbibes it so strongly, that double the labour in bleaching will hardly bring the linen made of such flax to an equality in whiteness with linen made of

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flax untinged. This seems to be equally unwise as though we were to dye cotton black first, in order to whiten it afterwards. These ponds, besides, become a great nuisance to the neighbourhood; the impregnated water is often of such a pernicious quality, that cattle, however thirsty, will not drink of it; and the effluvia of it may perhaps be nearly as infectious as it is offensive. If this effluvia is really attended with any contagious effects in our cold climate, a thing worth the enquiring into, how much more pernicious must its effects have been in the hot climate of Egypt, a country early noted for its great cultivation of flax?

"I have often thought that the process of watering might be greatly improved and shortened by plunging the new flax, after it is rippled, into scalding water; which, in regard to extracting the vegetative sap, would do in five minutes more than cold water would do in a fortnight, or perhaps more than cold water could do at all, in respect to the clearing the plant of sap. Rough almonds, when thrown into scalding water, are blanched in instant; but perhaps a fortnight's macerating those almonds in cold water would not make them part so easily with their skins, which are the same to them as the harle is to the flax. Were tea leaves to be infused in cold water a fortnight, perhaps the tea produced by that infusion would not be so good to the taste, nor so strongly tinged to the eye, as what is effected by scalding water in five minutes. By the same analogy, I think, flax or any small twig would be made to part with its bark much easier and quicker by being dipped in boiling water than by being steeped in cold water.

"This reflection opens a door for a great variety of new experiments in regard to flax. I would therefore recommend to gentlemen cultivators and farmers, to make repeated trials upon this new system, which would soon ascertain whether it ought to be adopted in practice or rejected. One thing, I think, we may be certain of, that if the Egyptians watered their flax in our common manner, they undoubtedly watered it in *very warm water*, from the great heat of their climate, which would probably make them neglect to think of water heated by any other means than that of the sun. A good general practice can only be established upon repeated trials. Though one experiment may fail, another with a little variation may succeed; and the importance of the object desired to be obtained will justify a good degree of perseverance in the prosecution of the means. In this view, as the Chinese thread is said to be very strong, it would be worth while to be acquainted with the practice of that distant nation, in regard to the rearing and manufacturing of flax, as well as with the methods used by the Flemings and the Dutch.

"Boiling water perhaps might at once clear the new flax from many impurities, which when not removed till it be spun into yarn, are then removed with difficulty, and with loss of substance to the yarn. Why should not the longitudinal fibres of the flax, before they be spun into yarn, be made not only as *fine* but as *clean* as possible? Upon the new system proposed, the act of bleaching would begin immediately after the rippling of the flax; and a little done then, might perhaps save much of what is generally done after the spinning and weaving. To spin dirty flax with a view
of

Flax. of cleansing it afterwards, appears to be the same impropriety as though we were to reserve part of the dressing given to leather till after it is made into a glove.

“Should the plunging of the flax into the boiling water not suffice to make the boon brittle enough, as I am inclined to think it would not, then the common watering might be added; but in that case probably half the time usually given to this watering would suffice, and the flax might then be laid in clear rivulets, without any apprehension of its infecting the water and poisoning the fish, or of being discoloured itself; for the boiling water into which it had been previously put, would have extracted all the poisonous vegetative sap, which I presume is what chiefly discolours the flax or kills the fish.

“On the supposition, that the use of boiling water in the preparation of flax may be found to be advantageous and profitable, I can recollect at present but one objection against its being generally adopted. Every flax grower, it may be said, could not be expected to have conveniences for boiling water sufficient for the purpose; the consumption of water would be great; and some additional expence would be incurred. In answer to this, I shall observe, that I presume any additional expence would be more than reimbursed by the better marketable price for the flax: for otherwise any new improvement, if it will not quit cost, must be dropt, were it even the searching after gold. In a large cauldron a great deal of flax might be dipt in the same water, and the consumption perhaps would not be more than a quart to each sheaf. Even a large household pot would be capable of containing one sheaf after another; and I believe the whole objection would be obviated, were the practice to prevail with us, as in Flanders and Holland, that the flax-grower and the flax-dresser should be two distinct professions.

“I shall conclude with recommending to those who are inclined to make experiments, not to be discouraged by the failure of one or two trials.—Perhaps the flax, instead of being just plunged into the scalding water ought to be kept in it five minutes, perhaps a quarter of an hour, perhaps a whole hour. Should five minutes, or a quarter of an hour, or an hour, not be sufficient to make the boon and harle easily separate, it might perhaps be found expedient to boil the flax for more than an hour; and such boiling when in this state might in return save several hours boiling in the article of bleaching. It is not, I think, at all probable that the boiling of the flax with the boon in it would prejudice the harle: for in the course of its future existence, it is made to be exposed 20 or 40 times to this boiling trial; and if not derimental in the one case, it is to be presumed it would not be detrimental in the other. Perhaps, after the boiling, it would be proper to pile up the flax in one heap for a whole day, or for half a day, to occasion some fermentation; or perhaps immediately after the boiling, it might be proper to wash it with cold water. The great object, when the flax is pulled, is to get the harle from the boon with as little loss and damage as possible; and if this is accomplished in a more complete manner than usual, considerable labour and expence will be saved in

the future manufacturing of the flax. On this account I think much more would be gained than lost, were the two or three last inches of the roots of the stems to be chopped off, or clipt off, previous to the flax being either watered or boiled. When the flax is watered, care should be taken not to spread it out to dry, when there is a hazard of its being exposed in its wet state to frost.”

FLAX made to resemble Cotton. In the Swedish Transactions for the year 1747, a method is given of preparing flax in such a manner as to resemble cotton in whiteness and softness, as well as in coherence. For this purpose a little sea-water is to be put into an iron pot or untinned copper kettle, and a mixture of equal parts of birch-ashes and quicklime strewed upon it: A small bundle of flax is to be opened and spread upon the surface, and covered with more of the mixture, and the stratification continued till the vessel is sufficiently filled. The whole is then to be boiled with sea-water for ten hours, fresh quantities of water being occasionally supplied in proportion to the evaporation, that the matter may never become dry. The boiled flax is to be immediately washed in the sea by a little at a time in a basket with a smooth stick at first while hot; and when grown cold enough to be borne by the hands, it must be well rubbed, washed with soap, laid to bleach, and turned and watered every day. Repetitions of the washing with soap expedite the bleaching; after which the flax is to be beat, and again well washed: when dry, it is to be worked and carded in the same manner as common cotton, and pressed betwixt two boards for 48 hours. It is now fully prepared and fit for use. It loses in this process near one half its weight, which is abundantly compensated by the improvement made in its quality.

The filamentous parts of different vegetables have been employed in different countries for the same mechanic uses as hemp and flax among us. See **FILAMENT.**

Earth-FLAX. See **AMIANTHUS.**

New-Zealand FLAX-Plant. See **PHORMIUM.**

Toad-FLAX. See **LINARIA.**

FLEA, in zoology. See **PULEX.**

FLEA-Bane, in botany. See **CONYZA.**

FLEA-Bitten, that colour of a horse which is white or grey, spotted all over with dark reddish spots.

FLEAM, in surgery and farriery, an instrument for letting blood of a man or horse. A case of fleams, as it is called by farriers, comprehends six sorts of instruments; two hooked ones, called *drawers*, and used for cleaning wounds; a pen-knife; a sharp-pointed lancet for making incisions; and two fleams, one sharp and the other broad-pointed. These last are somewhat like the point of a lancet, fixed in a flat handle, and no longer than is just necessary to open the vein.

FLECHIER (Esprit), bishop of Nîmes, one of the most celebrated preachers of his age, and the publisher of many panegyrics and funeral orations, was born at Perne in Avignon in 1632. He was nominated to the bishopric of Lavaur in 1685, and translated to Nîmes in 1687. At this latter place he founded an academy, and took the presidency upon himself: his own place was indeed a kind of academy, where he applied

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Flechien.

Flecknoe applied himself to train up orators and writers, who might serve the church, and do honour to the nation. He published, besides his panegyrics and funeral orations, 1. An History of the Emperor Theodosius, that of Cardinal Ximenes, and that of Cardinal Commendon. 2. Several Sermons. 3. Miscellaneous Works. 4. Letters, &c. He died in 1710.

FLECKNOE (Richard), an English poet in the reign of Charles II. more remarkable for Mr Dryden's satire on him than for any works of his own. He is said to have been originally a jesuit, and to have had good English connections in the Catholic interest. When Dryden lost the place of poet-laureat on the revolution, its being conferred on Flecknoe, for whom he had a settled aversion, gave occasion to his poem intitled *Mac Flecknoe*; one of the best written satires in our language, and from which Pope seems to have taken the hint for his *Dunciad*. Flecknoe, wrote some plays: but could never get more than one of them acted, and that was damned.

FLEECE, the covering of wool shorn off the bodies of sheep. See **WOOL**.

Golden FLEECE. See **ARGONAUTS**, and **GOLDEN Fleece**.

FLEET, commonly implies a company of ships of war, belonging to any prince or state; but sometimes it denotes any number of trading ships employed in a particular branch of commerce.

The admirals of his Britannic majesty's fleet are divided into three squadrons, viz. the red, the white, and the blue. When any of these officers are invested with the command of a squadron or detachment of men of war, the particular ships are distinguished by the colours of their respective squadron: that is to say, the ships of the red squadron wear an ensign whose union is displayed on a red field; the ensigns of the white squadron have a white field; and those of the blue squadron a blue field; the union being common to all three. The ships of war, therefore, are occasionally annexed to any of the three squadrons, or shifted from one to another.

Of whatsoever number a fleet of ships of war is composed, it is usually divided into three squadrons; and these, if numerous, are again separated into divisions. The admiral, or principal officer, commands the centre; the vice-admiral, or second in command, superintends the van-guard; and the operations of the rear are directed by the rear-admiral, or the officer next in rank. See the article **DIVISION**.

The disposition of a fleet, while proceeding on a voyage, will in some measure depend on particular circumstances; as the difficulty of the navigation, the necessity of dispatch, according to the urgency or importance of the expedition, or the expectation of an enemy in the passage. The most convenient order is probably to range it into three lines or columns, each of which is parallel to a line close-hauled according to the tack on which the line of battle is designed to be formed. This arrangement is more useful than any, because it contains the advantages of every other form without their inconveniences. The fleet being thus more inclosed will more readily observe the signals, and with greater facility form itself into the line of battle;

a circumstance which should be kept in view in every order of sailing. See *Naval TACTICS*.

FLEET, is also a noted prison in London, where persons are committed for contempt of the king and his laws, particularly of his courts of justice; or for debt, where any person will not or is unable to pay his creditors.

There are large rules and a warden belonging to the fleet prison; which had its name from the float or fleet of the river or ditch, on the side whereof it stands.

FLEETWOOD (William), a very learned English bishop in the beginning of the 18th century, of an ancient family in Lancashire. He distinguished himself during king William's reign, by his *Inscriptionum Antiquarum Sylloge*, by several sermons he preached on public occasions, and by his Essay on Miracles. He was designed by king William to a canonry of Windsor. The grant did not pass the seals before the king's death; but the queen gave it him, and he was installed in 1702. In 1703, he took a resolution to retire; and in 1707, published, without his name, his *Chronicon Pretiosum*. In 1707, he was nominated by the queen to the see of St Asaph. The change of the queen's ministry gave him much regret. In 1715, he published a pamphlet intitled "The 13th chapter of the Romans vindicated from the abusive senses put upon it." In 1714 he was translated to the bishopric of Ely; and died in 1723, aged 67. He published several other sermons and tracts, and was a man of great learning and exemplary piety.

FLEMINGIANS, or **FLANDRIANS**, in ecclesiastical history, a sect of rigid anabaptists, who acquired this name in the 16th century, because most of them were natives of Flanders, by way of distinction from the **WATERLANDIANS**. In consequence of some dissensions among the Flemings relating to the treatment of excommunicated persons, they were divided into two sects, distinguished by the appellations of *Flandrians* and *Frieslanders*, who differed from each other in their manners and discipline. Many of these in process of time came over to the moderate community of the Waterlandians, and these who remained separate are still known by the name of the Old Flemings or Flandrians; but they are comparatively few in number. These maintain the opinion of Menno with respect to the incarnation of Christ; alleging that his body was produced by the creating power of the Holy Ghost, and not derived from his mother Mary.

FLEMISH, or the **FLEMISH TONGUE**, is that which we otherwise call *Low Dutch*, to distinguish it from the *German*, whereof it is a corruption and a kind of dialect. See **GERMAN**.

It differs from the *Walloon*, which is a corruption of the French language. The Flemish is used through all the provinces of the Netherlands.

FLEMISH-Bricks, a neat, strong, yellow kind of bricks, brought from Flanders, and commonly used in paving yards, stables, &c. being preferable for such purposes to the common bricks. See the article **BRICKS**.

FLESH, in anatomy, a compound substance, consisting of the various softer solids of the animal body, and so denominated in contradistinction to bones. See **ANATOMY**, *passim*.

Fleet
Flesh.

FLESH

Flesh
Fletcher.

FLESH is also used, in theology, in speaking of the mysteries of the incarnation and eucharist. "The Word was made flesh," *Verbum caro factum est*.

The Romanists hold, that the bread in the sacrament of the supper is turned into the real flesh of Jesus Christ. See TRANSUBSTANTIATION.

FLESH is sometimes also used by botanists for the soft pulpy substance of any fruit, inclosed between the outer rind or skin and the seeds or stone; or for that part of a root, fruit, &c. fit to be eaten.

FLESH-Colour. See CARNATION.

FLETA, the name given to an unknown writer who lived about the end of the reign of Edward II. and beginning of Edward III. and who being a prisoner in the Fleet, wrote there an excellent treatise on the common law of England.

FLETCHER. See BEAUMONT and Fletcher.

FLETCHER (Andrew) of Salton, a celebrated Scots patriot and political writer, was descended from an ancient family who trace their origin to one of the followers of William the Conqueror. He was the son of Sir Robert Fletcher of Salton and Innerpeffer, and born in the year 1650. The tuition of our author was committed by his father, on his death-bed, to Mr (afterwards Bishop) Burnet, then his parish-minister; by whose care he received a pious, learned, and polite, education. Endowed with uncommon genius, and possessed of virtues and abilities peculiarly suited to the times in which he lived, Mr Fletcher quickly shone forth the ornament of his country, and the champion of its freedom. Having in the course of his classical studies and historical reading been impressed with an enthusiastic admiration both of ancient and modern republics, he had early contracted an ardent love of liberty, and an aversion to arbitrary rule. Hence his spirit the more readily took alarm at certain measures in the reign of Charles II. Being knight of the shire for Lothian to that parliament where the duke of York was commissioner, he openly opposed the designs of that prince and the bill of accession. He had a share with lord viscount Stair in framing the test-act, by which the duke of York complained that he lost Scotland. On these accounts he became peculiarly obnoxious to the duke; and was at length obliged to flee to Holland to avoid the fatal consequences of prosecutions which on various pretences were commenced against him. Being summoned before the privy-council and judiciary courts, and not appearing, he was declared traitor, and his estate confiscated.

In Holland he and Mr Baillie of Jerviswood were the only persons whom the earl of Argyle consulted concerning the designs which were then in agitation. In 1681 they came over to England, in order to concert matters with their party in that country; and were the only two who were intrusted so far as to be admitted to the secrets of lord Russel's council of six. Mr. Fletcher managed his part of the negociation with so much address, that administration could find no pretext for seizing him: nor could they fix upon him those articles on account of which Mr Baillie was condemned; to whose honour let it be remembered, that although offered a pardon on condition of his accusing his friend, he persisted in rejecting the proposal with indignation.

Mr Fletcher having joined the duke of Monmouth

upon his landing, received a principal command under him. But the duke was deprived of his services on the following occasion, as related by Sir John Dalrymple. Being sent upon an expedition, and not esteeming "times of danger to be times of ceremony," he had seized for his own riding the horse of a country gentleman [the mayor of Lynne] which stood ready equipt for its master. The master, hearing this, ran in a passion to Fletcher, gave him opprobrious language, shook his cane, and attempted to strike. Fletcher, though rigid in the duties of morality, yet having been accustomed to foreign services both by sea and land, in which he had acquired high ideas of the honour of a soldier and a gentleman, and of the affront of a cane, pulled out his pistol, and shot him dead on the spot. The action was unpopular in countries where such refinements were not understood. A clamour was raised against it among the people of the country: in a body they waited upon the duke with their complaints; and he was forced to desire the only soldier, and almost the only man of parts, in his army, to abandon him. With Fletcher all Monmouth's chance of success in war left him." But, in a manuscript memoir belonging to the family, we have the following notice concerning Mr Fletcher's connection with Monmouth, in which his separation from that prince is very differently accounted for: "To lord Marischal Mr Fletcher explained the motives which induced him first to join, and afterwards abandon, the duke of Monmouth. The former he ascribed to the duke's manifesto in Scotland relating to religion, and in England to liberty. For the latter he accounted by the disgust produced in his own mind and that of his associates, when the duke declared himself king, and broke faith with all who embarked with him on his principles. He complained heavily of the account commonly given of the death of the mayor of Lynne; and mentioned to lord Marischal, in proof of the contrary, that he did not leave the duke till he came to Taunton, where he was proclaimed king, several weeks after the death of the mayor of Lynne."

Seeing all the efforts of himself and his friends in favour of liberty frustrated at Taunton, he endeavoured to secure his own personal freedom by taking his passage in the first ship bound to a foreign country. It was his misfortune to land in Spain; where he was immediately arrested, cast into prison, and guarded by three different bands of soldiers, till a vessel should be prepared to carry him a victim in chains to the court of London. But on the morning before the ship could fail, whilst he looked pensive through the bars that secured the window of his room, he was hailed by a venerable personage who made signs to speak with him. The prison-doors he found open; and whilst his friendly conductor waved to him to follow him, he passed thro' three different guards of soldiers all fast asleep. Without being permitted to offer his thanks to his deliverer, he found himself obliged to prosecute with all speed the journey, in which he was directed by a person concerning whom he could never collect any information; and in disguise he proceeded in safety through Spain. He felt a peculiar pleasure in relating to his friends instances of the care of Providence which he had experienced during his exile; and entertained them often with narratives of this kind, which he always mingled with

Fletcher.
Memoirs
of Great
Britain and
Ireland.

Memoirs
of the family
of Salton.

Fletcher. with religious reflections. Of these, another may be here mentioned. Happening in the evening to pass the skirt of a wood at a few miles distance from a city where he intended to lodge, he came to a place where two roads met. After he had entered upon the road on the right, he was accosted by a female of a respectable figure, who warned him to turn back, and take the road on the left; for that in the other there was danger which he could not escape if he continued to proceed. His friendly monitor suddenly retired into the wood out of which she had issued no less unexpectedly. Having arrived at the city, the inhabitants were soon after alarmed by an account of the robbery and murder of several travellers who that evening had fallen into the hands of a banditti upon the very way in which he had intended to travel. From these and other instances of preservation from dangers, the devotion of his mind, habituated from infancy to an intercourse with heaven, lead him to conclude that he was in a peculiar manner the care of Providence, and that in critical cases his understanding received its direction from a supernatural impulse.

During his exile, he maintained a frequent and extensive correspondence with the friends of liberty at home; and he partly employed himself in making a curious collection of books, which compose the best private library in Scotland. But his genius also prompted him to engage in more active employments. He repaired to Hungary, and served several campaigns as a volunteer under the duke of Lorraine with great reputation. At length, understanding that the great design then projecting in Holland, and upon the issue of which he considered the liberties of Britain to be suspended, had attained a considerable degree of maturity he hastened thither; where his counsels and address were of eminent service. He came over with king William; and in zeal, activity, penetration, and political skill, proved inferior to none of the leaders in the Revolution.

Such, however, was his magnanimity, that from a survey of King William's papers it appears, that while others laboured to turn this grand event to the emolument of themselves and the aggrandisement of their family, Mr Fletcher asked nothing. His estate had been forfeited, and his house abandoned to military discretion; his fortune was greatly shattered, and his family reduced to circumstances of distress. Nothing was given him in recompence of all his suffering. On the contrary, he together with the duke of Hamilton was distinguished by marks of royal and ministerial dislike. Still, whatever private resentment he might entertain it appeared that his ruling principle was the good of his country; and that to this grand object of his heart he was willing to sacrifice all personal considerations. For when, in 1692 the abdicated king meditated an invasion, Mr Fletcher addressed a letter (preserved in Sir John Dalrymple's Collection) to the duke of Hamilton, in which every argument is employed with skill and energy to engage his Grace to forget his injuries, and in the present crisis to employ the extensive influence and authority he then possessed in the cause of freedom and of his country. This letter produced its full effect; and the duke returned to his duty, from which he had in part begun to deviate.

To follow our author through all the mazes of his political life subsequent to the Revolution, is beyond our purpose, and would exceed our limits. One or two circumstances more shall therefore suffice. Being elected a member for the parliament 1683, he showed an uniform zeal for the interest of his country. The thought of England's domineering over Scotland was what his generous soul could not endure. The indignities and oppression which Scotland lay under galled him to the heart; so that in his learned and elaborate discourses, he exposed them with undaunted courage and pathetic eloquence.—In that great event, the Union, he performed essential service. He got the act of security passed, which declared that the two crowns should not pass to the same head till Scotland was secured in her liberties civil and religious. Therefore lord Godolphin was forced into the Union, to avoid a civil war after the queen's demise. Although Mr Fletcher disapproved of some of the articles, and indeed of the whole frame of the Union; yet, as the act of security was his own work, he had all the merit of that important transaction.

We must not omit mentioning, that in the ardor of his political career Mr Fletcher forgot not the interests of the place that gave him birth. He esteemed the education of youth one of the noblest objects of government. On this subject he wrote a treatise, still extant, most characteristic of himself: and he established at Salton a foundation for the same purpose, of great utility while it lasted.

This great man died at London in 1716, aged 66. His remains were conveyed to Scotland, and deposited in the family vault at Salton.

That Mr Fletcher received neither honours nor emoluments from king William, may perhaps be in part attributed to himself; a circumstance, however, which must add greatly to the lustre of his character. His uncompromising virtue, and the sternness of his principles, were ill calculated to conciliate courtly favour. He was so zealous an assertor of the liberties of the people, that he was too jealous of the growing power of all princes; in whom he thought ambition so natural, that he was not for trusting the best of kings with the power which ill ones might make use of against their subjects: he was of opinion that all princes were made by, and for the benefit of, the people; and that they should have no power but that of doing good. This, which made him oppose king Charles and invade king James, led him also to oppose the giving so much power to king William, whom he would never serve after his establishment. So we are told by the author of *Short Political Characters*, a MS. in the library of the late T. Rawlinson, Esq.—Mr Lockhart, in his *Memoirs*, p. 72. expresses a belief that his aversion to the English and to the Union was so great, that, in revenge to them, he was inclined to side with the abdicated family: "But (adds he) as that was a subject not fit to be entered upon with him, this is only a conjecture from some innuendos I have heard him make; but so far is certain, he liked, commended, and conversed with high-flying Tories, more than any other set of men; acknowledging them to be the best countrymen, and of most honour, integrity, and ingenuity." It seems difficult to reconcile this with Mr Fletcher's avowed principles and the general tenor of his conduct

Fletcher.

Fletcher, duct. May we suppose, that chagrin, if not at the neglect or the ill treatment which he had himself received from government since the Revolution, yet at the public measures relating to his native country, might have occasioned him to relent in his sentiments with regard to the exiled family!—In the family-memoirs already quoted, we are informed, That “Lord Marischal held Mr Fletcher’s character in high admiration;” and that, “when governor of Neufchatel, where Rousseau resided about the year 1766, he prevailed with this extraordinary genius to write the life of a man whose character and actions he wished to have transmitted to posterity with advantage. For this purpose, his lordship applied to an honourable relation of Mr Fletcher’s for materials, which by him were transmitted to Lord Marischal: but the design failed through Rousseau’s desultory and capricious disposition.” This anecdote must appear incompatible with the known loyalty and attachments of the Earl Marischal, unless we suppose him to have been privy to some such sentiments of Mr Fletcher as those alluded to by Mr Lockhart: for how could we suppose him anxious to promote a composition, in which the task would be to celebrate principles diametrically opposite to his own, and to applaud actions subversive of that royal family in whose cause he had ventured his life, and forfeited his fortune, and foregone his country!—But however these circumstances may be reconciled,—as the integrity, disinterestedness, and public spirit of Mr Fletcher, have been universally acknowledged, there is reason to believe, that all his sentiments and actions were founded in honour, and that he never once pursued a measure further than he judged it to be for the interest of his country.

Mr Fletcher was master of the English, Latin, Greek, French, and Italian languages; and well versed in history, the civil law, and all kinds of learning. In his travels, he had not only acquired considerable knowledge in the art of war, but also became versant in the respective interests of the several princes and states of Europe. In private life he was affable to his friends, and free from all manner of vice. He had a penetrating, clear, and lively apprehension; but it is said to have been too much wedded to opinions, and impatient of contradiction.—He possessed an uncommon elevation of mind, accompanied with a warmth of temper, which would suffer him to brook from no rank among men, nor in any place, an indignity. Of this he exhibited a singular proof in the Scots parliament. The earl of Stair, secretary of state, and minister for Scotland, having in the heat of debate used an improper expression against Mr Fletcher, he seized him by his robe, and insisted upon public and immediate satisfaction. His Lordship was obliged instantly to beg his pardon in presence of parliament.

Mr Fletcher was by far the finest speaker in the parliament of Scotland: the earl of Stair alone rivalled him. The latter was famed for a splendid, the former for a close and nervous, eloquence. He formed his style on the models of antiquity; and the small volume of his works, Sir John Dalrymple observes, tho’ imperfectly collected, is one of the very few classical compositions in the English language.

FLETEWOOD (William), an eminent English lawyer and recorder of London, in the reign of queen
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Elizabeth. He was very zealous in suppressing mass-houses, and committing Popish priests: but once rushing in upon mass at the Portuguese ambassador’s house, he was committed to the Fleet for breach of privilege, but soon released. Mr Wood says, “He was a learned man, and a great antiquary, but of a marvellous merriness and pleasant conceit.” He was a good popular speaker, and wrote well upon subjects of government. His principal works are, 1. *Annalium tam regum Edwardi V. Richardi III. & Henrici VII. quam Henrici VIII.* 2. A Table of the Reports of Edmund Plowden. 3. The Office of a Justice of Peace. He died about the year 1593.

FLEVILLEA, in botany: a genus of the hexandria order, belonging to the diœcia class of plants. The male calyx and corolla are quinquefid; the stamina five; the nectarium five converging filaments. The female calyx is quinquefid; there are three styli; fruit an hard trilocular barky apple.

FLEURI (Claude), one of the best French critics and historians of his age, was born at Paris in 1640. He applied himself to the law, was made advocate for the Parliament of Paris, and attended the bar nine years; he then entered into orders, and was made preceptor to the princes of Conti. In 1690, the king made him sub-preceptor to the dukes of Burgundy, Anjou and Berry; and in 1706, when the education of these young princes was completed, the king gave him the priory of Argenteville belonging to the Benedictines in the diocese of Paris. In 1716, he was chosen counsellor to Louis XV. and died in 1723. He was the author of a great number of esteemed French works; the principal of which are, 1. An ecclesiastical history, in 20 volumes, the last of which ends with the year 1414. 2. The manners of the Israelites and Christians. 3. Institutions of ecclesiastical law. 4. An historical catechism. 5. On the choice and method of study. 6. The duties of masters and servants, &c.

FLEURI (Andrew Hercules de), bishop of Frejus, preceptor to Louis XV. grand almoner to the queen, cardinal and minister of state, was born in 1653, and died in 1743. He was an able negociator; and distinguished himself during his ministry by his probity, his zeal for the happiness of his country, and his pacific disposition.

FLEXIBLE, in physics, a term applied to bodies capable of being bent or diverted from their natural figure or direction.

FLEXOR, in anatomy, a name applied to several muscles, which are so called from their office, which is to bend the parts to which they belong; in opposition to the *extensors*, which open or stretch them. See *ANATOMY, Table of the Muscles.*

FLIGHT, the act of a bird in flying: or the manner, duration, &c. thereof.

Almost every kind of bird has its particular flight: the eagle’s flight is the highest; the flight of the sparrow-hawk and vulture is noble, and fit for high enterprise and combat. The flight of some birds is low, weak, and transient; the flight of the partridge and pheasant is but of short continuance; that of the dove is laboured; that of the sparrow undulatory, &c.

The augurs pretended to foretel future events from the flight of birds. See *AUGURY.*

FLIGHT. In melting the lead-ore in the works at Mendip,
P p

Flevillea

Flight.

Flint.

Mendip, there is a substance which flies away in the smoke, which they call the flight. They find it sweetish upon their lips, if their faces happen to be in the way of the smoke, which they avoid as much as possible. This falling on the grass, kills cattle that feed thereon; and, being gathered, and carried home, kills rats and mice in their houses; that which falls on the sand, they gather, and melt upon a flag-hearth into shot and sheet-lead.

FLINT, in natural history, a kind of semitransparent or quite opaque stones; generally of a roundish form, and covered with white crust; of a smooth, uniform, shining texture; so hard, that they will strike fire with steel; calcinable by fire, after which they become white, friable, and according to Henckel, heavier than before, and soluble by acids, vitrifiable only by the very violent heat of the largest speculums, such as that of Villette, and not even by the focus of one of Tschirnhausen's lenses, according to an experiment of Neumann. They are found generally in beds of chalk and of sand; but never forming entire strata of rock as jasper does. By long exposure to air and the sun, they seem to decay, to lose their lustre, their firmness of texture, and to be changed to a white calcareous earth or chalk. Hence they are almost always found covered with a white chalky crust. They are also convertible into a calcareous earth by fusion, or vitrification with so much fixed alkali that they shall resolve into a liquid mass called the *liquamen* or *oil of flints*, and by precipitation from the fixed alkali by means of acids. See CHEMISTRY, n° 1069.

This genus of stones, or siliceous earth, Cronstedt considers as of an intermediate nature between the quartz and jasper; both of which it so nearly resembles, that it is difficult to distinguish them. Our author characterises it in the following manner: 1. It is more uniformly solid and not so much cracked in the mass as quartz, but more pellucid than the jasper. 2. It bears the air better than the jasper, but worse than the quartz. 3. For the purpose of glass-making it is better than jasper, but not quite so good as quartz. 4. Whenever it has had an opportunity of shooting into crystals, those of quartz are always found in it; as if the quartz made one of its constituent parts, and had been squeezed out of it. This may be seen in every hollow flint and its clefts, which are always filled up with quartz. 5. It often shows most evident marks of having been originally in a soft and slimy tough state like jelly.—To these properties the following are added by other authors. 7. When broken, it is scaly, generally unequal, and cracks into thin lamellæ. 8. In a calcining heat it becomes opaque, white, and milky.

Breaking of FLINTS. The art of cutting, or rather breaking, flint stones into uniform figures, is by some supposed to be one of the arts now lost. That it was known formerly, appears from the ancient Bridewell at Norwich, from the gate of the Augustine friars at Canterbury, that of St John's Abbey at Colchester, and the gate near Whitehall, Westminster. But that the art is not lost, and that the French know it, appears from the platform on the top of the royal observatory at Paris, which, instead of being leaded, is paved with flint cut or broken into regular figures. But we know not that this art has been any where described.

FLINTS, in the glass-trade. The way of preparing

flints for the nicest operations in the glass-trade is this. Choose the hardest flints, such as are black and will resist the file, and will grow white when calcined in the fire. Cleanse these of the white crust that adheres to them, then calcine them in a strong fire, and throw them while red-hot into cold water; wash off the ashes that may adhere to them, and powder them in an iron mortar, and sift them through a very fine sieve; pour upon this powder some weak aquafortis, or the phlegm of aquafortis, to dissolve and take up any particles of iron it may have got from the mortar; stir this mixture several times, then let it rest, and in the morning pour of the liquor, and wash the powder several times with hot water, and afterwards dry it for use. You will thus have a powder for making the purest glass as perfectly fine and faultless as if you had used rock-crystal itself.

The washing off the ferrugineous particles with aquafortis is not necessary when the glass intended to be made is to be tinged with iron afterwards; but when meant to be a pure white, this is the method that will secure success.

FLINT, the chief town of Flintshire, in North Wales. It is commodiously seated on the river Dee; and is but a small place, though it sends one member to parliament. It was formerly noted for its castle, where Richard II. took shelter on his arrival from Ireland; but having quitted it, he was taken prisoner by the duke of Lancaster. The castle now is in a ruinous condition. This castle stands close to the sea on a rock, which in various parts forms several feet of its foundation. It covers about three quarters of an acre. The assizes are still held in the town. It is 195 miles north-west of London.

FLINTSHIRE, a county of Wales,ⁿ bounded on the north-east and east by an arm of the sea, which is properly the mouth of the river Dee; on the north-west by the Irish sea; and on the south south-west and west by Denbighshire. It is the least of all the counties in Wales, being but 33 miles in length and 9 in breadth. It is divided into five hundreds; in which are two market-towns, and 28 parishes, with 32,400 inhabitants. The greatest part of this county lies in the diocese of St Asaph, and the rest belongs to that of Chester. It sends two members to parliament, one for the county and one for Flint; and pays one part of the land-tax. The air is cold, but healthful. It is full of hills, intermixed with a few valleys, which are very fruitful, producing some wheat and plenty of rye. The cows, though small, yield a great quantity of milk in proportion to their size, and are excellent beef. The mountains are well stored with lead, coal, and mill-stones. This county also produces good butter, cheese, and honey; of which last the natives make methglin, a wholesome liquor much used in these parts.

FLIP, a sort of sailors drink, made of malt liquor, brandy, and sugar, mixed.

FLOAT, a certain quantity of timber bound together with rafters athwart, and put into a river to be conveyed down the stream; and even sometimes to carry burdens down a river with the stream.

FLOAT-Boards, those boards fixed to water-wheels of under-shot-mills, serving to receive the impulse of the stream, whereby the wheel is carried round. See the articles WHEEL and MILL.

Flint

||
Float.

Floats
||
Floor.

It is no advantage to have too great a number of float boards; because, when they are all struck by the water in the best manner that it can be brought to come against them, the sum of all the impulses will be but equal to the impulse made against one float-board at right angles, by all the water coming out of the penstock through the opening, so as to take place on the float-board. The best rule in this case is, to have just so many, that each of them may come out of the water as soon as possible, after it has received and acted with its full impulse. As to the length of the float-board, it may be regulated according to the breadth of the mill. See the article MILL.

FLOATS for Fishing. See FISHING-FLOATS.

FLOATAGES, all things floating on the surface of the sea or any water: a word much used in the commissions of water-bailiffs.

FLOATING-Bridge. See BRIDGE.

FLOCK-Paper. See PAPER.

FLOOD, a deluge or inundation of waters. See DELUGE.

FLOOD is also used in speaking of the tide. When the water is at lowest, it is called *ebb*; when rising, *young flood*; when at highest, *high flood*; when beginning to fall, *ebb-water*.

FLOOD-mark, the mark which the sea makes on the shore at flowing water and the highest tide: it is also called *high-water mark*.

FLOOK of an anchor. See ANCHOR.

FLOOKING, among miners, a term used to express a peculiarity in the load of a mine. The load or quantity of ore is frequently intercepted in its course by the crossing of a vein of earth or stone, or some different metallic substance: in which case the load is moved to one side, and this transient part of the land is called a *flook*.

FLOOR, in building, the underside of a room, or that part we walk on.

Floors are of several sorts; some of earth, some of brick, others of stone, others of boards, &c.

For brick and stone FLOORS, see PAVEMENT.

For boarded FLOORS, it is observable, that the carpenters never floor their rooms with boards till the carcass is set up, and also inclosed with walls, lest the weather should injure the flooring. Yet they generally rough-plane their boards for the flooring before they begin any thing else about the building, that they may set them by to dry and season, which is done in the most careful manner. The best wood for flooring is the fine yellow deal well seasoned, which, when well laid, will keep its colour for a long while; whereas the white sort becomes black by often washing, and looks very bad. The joints of the boards are commonly made plain, so as to touch each other only; but, when the stuff is not quite dry, and the boards shrink, the water runs through them whenever the floor is washed, and injures the ceiling underneath. For this reason they are made with feather edges, so as to cover each other about half an inch, and sometimes they are made with grooves and tenons; and sometimes the joints are made with dove-tails; in which case the lower edge is nailed down and the next dove into it, so that the nails are concealed. The manner of measuring floors is by squares of 10 feet on each side, so that taking the length and breadth and multiplying

them together and cutting off two decimals, the content of a floor in square will be given. Thus 18 by 16 gives 288 or 2 squares and 88 decimal parts.

Earthen-FLOORS, are commonly made of loam, and sometimes, especially to make malt on, of lime, and brooksand, and gun-dust, or anvil-dust from the forge.

Ox-blood and fine clay, tempered together, Sir Hugh Plat says, make the finest floor in the world.

The manner of making earthen floors for plain country habitations is as follows: Take two thirds of lime, and one of coal-ashes well sifted, with a small quantity of loam clay; mix the whole together, and temper it well with water, make it up into a heap: let it lie a week or ten days and then temper it over again. After this, heap it up for three or four days, and repeat the tempering very high, till it become smooth, yielding, tough, and gluey. The ground being then levelled, lay the floor therewith about 2½ or 3 inches thick, making it smooth with a trowel: the hotter the season is, the better; and when it is thoroughly dried, it will make the best floor for houses, especially malt-houses.

If any one would have their floors look better, let them take lime made of rag-stones, well tempered with whites of eggs, covering the floor about half an inch thick with it, before the under flooring is too dry. If this be well done, and thoroughly dried, it will look when rubbed with a little oil as transparent as metal or glass. In elegant houses, floors of this nature are made of stucco, or of plaster of Paris beaten and sifted, and mixed with other ingredients.

FLOOR of a ship, strictly taken, is only so much of her bottom as she rests on when aground.

Such ships as have long, and withal broad floors, lie on the ground with most security, and are not apt to heel, or tilt on one side; whereas others, which are narrow in the floor, or, in the sea-phraze, *cranked by the ground*, cannot be grounded without danger of being overturned.

FLOOR-Timbers, in a ship, are those parts of a ship's timbers which are placed immediately across the keel, and upon which the bottom of the ship is framed; to these the upper parts of the timbers are united, being only a continuation of floor-timbers upwards.

FLORA, the reputed goddess of flowers, was, according to Lactantius, only a lady of pleasure, who having gained large sums of money by prostituting herself, made the Roman people her heir, on condition that certain games called *Floralia* might be annually celebrated on her birth-day. Some time afterwards, however, such a foundation appearing unworthy the majesty of the Roman people, the senate, to ennoble the ceremony, converted Flora into a goddess, whom they supposed to preside over flowers; and so made it part of religion to render her propitious, that it might be well with their gardens, vineyards, &c. But Vossius (*de Idolol.* lib. i. c. 12) can by no means allow the goddess Flora to have been the courtesan abovementioned: he will rather have her a Sabine deity, and thinks her worship might have commenced under Romulus. His reason is, that Varro, in his fourth book of the Latin tongue, ranks Flora among the deities to whom Tatius king of the Sabines offered up vows before he joined battle with the Romans. Add, that from another passage in Varro it appears,

Floor,
Flora.

Florales
1
Florence.

appears, that there were priests of Flora, with sacrifices, &c. as early as the times of Romulus and Numa.

The goddess Flora was, according to the poets, the wife of Zephyrus. Her image in the temple of Castor and Pollux was dressed in a close habit, and she held in her hands the flowers of pease and beans: but the modern poets and painters have been more lavish in setting off her charms, considering that no parts of nature offered such innocent and exquisite entertainment to the sight and smell, as the beautiful variety which adorns, and the odour which embalms, the floral creation.

FLORALES LUDI, or FLORAL GAMES, in antiquity, were games held in honour of Flora, the goddess of flowers.—They were celebrated with shameful debaucheries. The most licentious discourses were not enough, but the courtesans were called together by the sound of a trumpet, made their appearance naked, and entertained the people with indecent shows and postures; the comedians appeared after the same manner on the stage. Val. Maximus relates, that Cato being once present in the theatre on this occasion, the people were ashamed to ask for such immodest representations in his presence; till Cato, apprised of the reservedness and respect with which he inspired them, withdrew, that the people might not be disappointed of their accustomed diversion. There were several other sorts of shows exhibited on this occasion; and if we may believe Suetonius in *Galba*, c. vi. and Vopiscus in *Carinus*, these princes presented elephants dancing on ropes on these occasions.

The ludi florales, according to Pliny, lib. xviii. c. 29. were instituted by order of an oracle of the Sibyls, on the 28th of April; not in the year of Rome 1056, as we commonly read it in the ancient editions of that author; nor in 1054, as F. Hardouin has corrected it, but, as Vossius reads it, in 513. Though they were not regularly held every year till after 580. They were chiefly held in the night-time, in the Patrician street: some will have it there was a circus for the purpose on the hill called Hortulorum.

FLORALIA, in antiquity, a general name for the feasts, games, and other ceremonies, held in honour of the goddess Flora. See FLORA and FLORALES Ludi.

FLORENCE, the capital of the duchy of Tuscany, and one of the finest cities in Italy. It is surrounded on all sides but one with high hills, which rise insensibly, and at last join with the lofty mountains called the *Apennines*. Towards Pisa, there is a vast plain of 40 miles in length; which is so filled with villages and pleasure-houses, that they seem to be a continuation of the suburbs of the city. Independent of the churches and palaces of Florence, most of which are very magnificent, the architecture of the houses in general is in a good taste; and the streets are remarkably clean, and paved with large broad stones chiseled so as to prevent the horses from sliding. The city is divided into two unequal parts by the river Arno, over which there are no less than four bridges in sight of each other. That called the *Ponte della Trinità*, which is uncommonly elegant, is built entirely of white marble, and ornamented with four beautiful statues representing the Seasons. The quays, the buildings on each side, and the bridges, render that part of Florence through which the river runs by far the finest. Every

corner of this beautiful city is full of wonders in the arts of painting, statuary, and architecture. The streets, squares, and fronts of the palaces are adorned with a great number of statues; some of them by the best modern masters, Michael Angelo, Bandinelli, Donatello, Giovanni di Bologna, Benvenuto Cellini, and others. Some of the Florentine merchants formerly were men of vast wealth, and lived in a most magnificent manner. One of them, about the middle of the fifteenth century, built that noble fabric, which, from the name of its founder, is still called the *Palazzo Pitti*. The man was ruined by the prodigious expence of this building, which was immediately purchased by the Medici family, and has continued ever since to be the residence of the sovereigns. The gardens belonging to this palace are on the declivity of an eminence. On the summit there is a kind of fort, called *Belvedere*. From this, and from some of the higher walks, you have a complete view of the city of Florence, and the beautiful vale of Arno, in the middle of which it stands. This palace has been enlarged since it was purchased from the ruined family of Pitti. The furniture is rich and curious, particularly some tables of Florentine work, which are much admired. The most precious ornaments, however, are the paintings. The walls of what is called the *Imperial Chamber*, and painted in fresco, by various painters; the subjects are allegorical, and in honour of Lorenzo of Medicis distinguished by the name of the *Magnificent*. The famous gallery attracts every stranger. One of the most interesting parts of it, in the eyes of many, is the series of Roman emperors, from Julius Cæsar to Gallienus, with a considerable number of their empresses, arranged opposite to them. This series is almost complete; but wherever the bust of an emperor is wanting, the place is filled up by that of some other distinguished Roman. The celebrated Venus of Medici, which, take it all in all, is thought to be the standard of taste in female beauty and proportion, stands in a room called the *Tribunal*. The inscription on its base mentions its being made by Cleomenes an Athenian, the son of Apollodorus. It is of white marble, and surrounded by other master-pieces of sculpture, some of which are said to be the works of Praxiteles and other Greek masters. In the same room are many valuable curiosities, besides a collection of admirable pictures by the best masters. There are various other rooms, whose contents are indicated by the names they bear; as, the Cabinet of Arts, of Astronomy, of Natural History, of Medals, of Porcelain, of Antiquities; the Saloon of the Hermaphrodite, so called from a statue which divides the admiration of the amateurs with that in the Borghese village at Rome, though the excellence of the execution is disgraced by the vileness of the subject; and the Gallery of Portraits, which contains the portraits of the most eminent painters (all executed by themselves) who have flourished in Europe during the three last centuries. Our limits will not admit of a detail of the hundredth part of the curiosities and buildings of Florence. We must not however omit mentioning the chapel of St Lorenzo, as being perhaps the finest and most expensive habitation that ever was reared for the dead; it is encrusted with precious stones, and adorned by the workmanship of the best modern sculptures. Mr Addison remarked, that

Florence. that this chapel advanced so very slowly, that it is not impossible that the family of Medicis may be extinct before their burial-place is finished. This has actually taken place; the Medici family is extinct, and the chapel remains still unfinished.

Florence is a place of some strength and contains an archbishop's see and an university. The number of inhabitants is calculated at 80,000. They boast of the improvements they have made in the Italian tongue, by means of their Academia della Crusca; and several other academies are now established at Florence. Though the Florentines affect great state, yet their nobility and gentry drive a retail trade in wine, which they sell from their cellar windows, and sometimes they even hang out a broken flask, as a sign where it may be bought. They deal, besides wine and fruits, in gold and silver stuffs. The Jews are not held in that degree of odium, or subjected to the same humiliating distinctions here, as in most other cities of Europe; and it is said that some of the richest merchants are of that religion.

As to the manners and amusements of the inhabitants, Dr Moore informs us, that "besides the *conversazione* which they have here as in other towns of Italy, a number of the nobility meet every day at a house called the *Casino*. This society is pretty much on the same footing with the clubs in London. The members are elected by ballot. They meet at no particular hour, but go at any time that is convenient. They play at billiards, cards, and other games, or continue conversing the whole evening, as they think proper. They are served with tea, coffee, lemonade, ices, or what other refreshments they chose; and each person pays for what he calls for. There is one material difference between this and the English clubs, that women as well as men are members. The company of both sexes behave with more frankness and familiarity to strangers, as well as to each other, than is customary in public assemblies in other parts of Italy. The opera is a place where the people of quality pay and receive visits, and converse as freely as at the *Casino* above-mentioned. This occasions a continual passing and re-passing to and from the boxes, except in those where there is a party of cards formed; it is then looked on as a piece of ill manners to disturb the players. From this it may be guessed, that here, as in some other towns in Italy, little attention is paid to the music by the company in the boxes, except at a new opera, or during some favourite air. But the dancers command a general attention: as soon as they begin, conversation ceases; even the card players lay down their cards, and fix their eyes on the *ballette*. Yet the excellence of Italian dancing seems to consist in feats of strength, and a kind of jerking agility, more than in graceful movement. There is a continual contest among the performers who shall spring highest. You see here none of the sprightly alluring gaiety of the French comic dancers, nor of the graceful attitudes and smooth flowing motions of the performers in the serious opera at Paris. It is surprising, that a people of such taste and sensibility as the Italians, should prefer a parcel of athletic jumpers to elegant dancers. On the evenings on which there is no opera, it is usual for the genteel company to drive to a public walk immediately without the city, where they remain till it begins to grow duskish." E. Long. 12. 24. N. Lat. 43. 34.

FLORENCE, an ancient piece of English gold-coin. Every pound-weight of standard-gold was to be coined into 50 Florences to be current at six shillings each; all which made in tale 15 pounds; or into a proportionate number of half-Florences or quarter pieces, by indenture of the mint: 18 Edw. III.

FLORENTIA (anc. geog.), a town of Etruria, on the Arnus; of great note in Sylla's wars. Now called *Florenza* or *Firenza* by the Italians; *Florence* in English. E. Long. 11. Lat. 43. 30.

FLORENTINE MARBLE. See CITADANESCA.

FLORESCENTIA (from *floresco*, "to flourish or bloom"): the act of flowering, which Linnæus and the sexualists compare to the act of generation in animals; as the ripening of the fruit in their opinion resembles the birth. See FLOWER.

FLORID STYLE, is that too much enriched with figures and flowers of rhetoric.

FLORIDA, the most southerly province of the British Empire in America before the last war, bounded on the south by the Gulph of Mexico, on the north by the Apalachian mountains, on the east by the province of Georgia, and on the west by the river Mississippi. It was first discovered, in 1497, by Sebastian Cabot, a Venetian, then in the English service; whence a right to the country was claimed by the kings of England; and this province as well as Georgia, were included in the charter granted by Charles II. to Carolina. In 1512, however, Florida, was more fully discovered by Ponce de Leon an able Spanish navigator, but who undertook his voyage from the most absurd motives that can be well imagined. The Indians of the Caribbee islands had among them a tradition, that somewhere on the continent there was a fountain whose waters had the property of restoring youth to all old men who tasted them. The romantic imaginations of the Spaniards were delighted with this idea. Many embarked in voyages to find out this imaginary fountain, who were never afterwards heard of. Their superstitious countrymen never imagined that these people had perished. They concluded that they did not return only because they had drunk of the immortalizing liquor, and had discovered a spot so delightful, that they did not choose to leave it.—Ponce de Leon set out with this extravagant view as well as others, and fully persuaded of the existence of a third world, the conquest of which was to immortalize his name. In the attempt to discover this country, he rediscovered Florida; but returned to the place from whence he came visibly more advanced in years than when he set out.—For some time this country was neglected by the Spaniards, and some Frenchmen settled in it. But the new colony being neglected by the ministry, and Philip II. of Spain having accustomed himself to think that he was the sole proprietor of America, fitted out a fleet at Cadiz to destroy them. His orders were executed with barbarity. The French entrenchments were forced, and most of the people killed. The prisoners were hanged on trees; with this inscription, "Not as Frenchmen but as Heretics."

This cruelty was soon after revenged by Dominic de Gourgues, a skilful and intrepid seamen of Gascony, an enemy to the Spaniards, and passionately fond of hazardous expeditions and of glory. He sold his estate; built some ships; and with a select band of adventurers like

Florentia
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Florida.

Florile-
gium
I
Floriniani.

like himself, embarked for Florida. He drove the Spaniards from all their posts with incredible valour and activity: defeated them in every rencounter; and, by way of retaliation, hung the prisoners on trees, with this inscription, "Not as Spaniards, but as Assassins." This expedition was attended with no other consequences; Gourgues blew up the forts he had taken and returned home, where no notice was taken of him. It was conquered in 1539, by the Spaniards under Ferdinand de Soto, not without a great deal of bloodshed; as the natives were very warlike, and made a vigorous resistance. The settlement, however, was not fully established till the year 1665; when the town of St Augustine, the capital of the colony while it remained in the hands of the Spaniards, was founded. In 1586, this place was taken and pillaged by sir Francis Drake. It met with the same fate in 1665, being taken and plundered by Captain Davis and a body of buccaneers. In 1702, an attempt was made upon it by Colonel More, governor, of Carolina. He set out with 500 English and 700

Indians; and having reached St Augustine, he besieged it for three months; at the expiration of which, the Spaniards having sent some ships to the relief of the place, he was obliged to retire. In 1740, another attempt was made by General Oglethorpe: but he being outwitted by the Spanish governor, was forced to raise the siege with loss; and Florida continued in the hands of the Spaniards till the year 1763, when it was ceded by treaty to Great Britain.—During the last war it was again reduced by his Catholic majesty, and was guaranteed to the crown of Spain at the peace.

FLORILEGIUM, FLORILEGE, a name the Latins have given to what the Greeks call *ανθολογία*, *anthology*; viz. a collection of choice pieces, containing the finest and brightest things in their kind.

FLORILEGE is also particularly used for a kind of breviary, in the Eastern church, compiled by Arcadius, for the conveniency of the Greek priests and monks, who cannot carry with them, in their travels and pilgrimages, all the volumes wherein their office is dispersed. The florilegium contains the general rubrics, psalter, canticles, the horologium, and the office of the feria, &c.

FLORIN, is sometimes used for a coin, and sometimes for a money of account.

Florin, as a coin, is of different values, according to the different metals and different countries where it is struck. The gold florins are most of them of a very coarse alloy, some of them not exceeding thirteen or fourteen carats, and none of them seventeen and a half. See *MONEY-Table*.

Florin, as a money of account, is used by the Italian, Dutch, and German merchants and bankers, but admits of different divisions in different places. *Ibid.*

FLORINIANI, or FLORIANI, a sect of heretics, of the second century, denominated from its author Florinus, or Florianus, a priest of the Roman church, deposed along with Blastus for his errors. Florinus had been a disciple of St Polycarp, along with Irenæus. He made God the author of evil; or rather asserted, that the things forbidden by God are not evil, but of his own appointing. In which he followed the errors of Valentinus, and joined himself with the Carpocratians. They had also other names given them. Phi-

lastrius says, they were the same with the *Carpophorians*. He adds, they were also called *soldiers, milites, quia de militaribus fuerunt*. St Irenæus calls them *Gnostics*; St Epiphanius, *Phibionites*; and Theodoret, *Borborites*, on account of the impurities of their lives. Others call them *Zaccheans*; others *Coddians*, &c. though for what particular reasons, it is not easy to say, nor perhaps would it be worth while to inquire.

FLORIS (Francis), an eminent historical painter, was born at Antwerp in 1520. He followed the profession of a statuary till he was twenty years of age; when preferring painting, he entered the school of Lambert Lombard, whose manner he imitated very perfectly. He afterwards went to Italy, and completed his studies from the most eminent masters. The great progress he made in historical painting, at his return procured him much employment; and his countrymen complimented him with the flattering appellation of *the Flemish Raphael*. He got much money, and might have rendered his acquaintance more worthy of the attention of the great, had he not debased himself by frequent drunkenness. He died 1570, aged 50.

FLORIST, a person curious or skilled in flowers; their kinds, names, characters, culture, &c. It is also applied to the author who writes what is called the flora of any particular place, that is, a catalogue of the plants and trees which are found spontaneously growing there.

FLORUS (Lucius Annæus), a Latin historian, of the same family with Seneca and Lucan. He flourished in the reigns of Trajan and Adrian; and wrote an Abridgement of the Roman History, of which there have been many editions. It is composed in a florid and poetical style; and is rather a panegyric on many of the great actions of the Romans, than a faithful and correct recital of their history. He also wrote poetry, and entered the lists against the emperor Adrian, who satirically reproached him with frequenting taverns and places of dissipation.

FLORY, FLOWRY, or Fleury, in heraldry, a cross that has the flowers at the end circumflex and turning down; differing from the *potence*, inasmuch as the latter stretches out more like that which is called *patee*.

FLOS, FLOWER, in botany. See **FLOWER**.

Femineus FLOS, a flower which is furnished with the pointal or female organs of generation, but wants the stamina or male organ. Female flowers may be produced apart from the male, either on the same root or on distinct plants. Birch and mulberry are examples of the first case; willow and poplar of the second.

Masculus FLOS, a male flower. By this name Linæus and the sexualists distinguish a flower which contains the stamen, reckoned by the sexualists the male organ of generation; but not the stigma or female organ. All the plants of the class *diœcia* of Linæus have male and female flowers upon different roots: those of the class *monœcia* bear flowers of different sexes on the same root. The plants, therefore, of the former are only male and female; those of the latter are androgynous; that is, contain a mixture of both male and female flowers.

FLOS in chemistry, the most subtle part of bodies separated from the more gross parts by sublimation in a dry form.

FLOTA, or FLOTTA, fleet; a name the Spaniards give

Floris
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Floto.

Flotson
Flour.

give particularly to the ships which they send annually from Cadiz to the port of Vera Cruz, to fetch thence the merchandizes gathered in Mexico for Spain. It consists of the captains, admiral, and patach, or pinance, which go on the king's account; and about 16 ships, from 400 to 1000 tons, belonging to particular persons. They set out from Cadiz about the month of August, and are 18 or 20 months before they return. Those sent to fetch the commodities prepared in Peru are called *galleons*.

The name *flotilla* is given to a number of ships, which get before the rest in their return, and give information of the departure and cargo of the *flota* and *galleons*.

FLOTSON, or FLOTSOM, goods that by shipwreck are lost, and floating upon the sea; which, with *jettison* and *lagan*, are generally given to the lord admiral; but this is the case only where the owners of such goods are not known. And here it is to be observed, that *jettison* signifies any thing that is cast out of a ship when in danger, and afterwards is beat on the shore by the water, notwithstanding which the ship perishes. *Lagan* is where heavy goods are thrown overboard, before the wreck of the ship, and sink to the bottom of the sea.

FLOUNDER, FLUKE, or But, in ichthyology. See **PLEURONECTES**.

Flounders may be fished for all day long, either in a swift stream, or in the still deep water; but best in the stream, in the months of April, May, June, and July; the most proper baits are all sorts of worms, wasps, and gentles.

FLOUR, the meal of wheat-corn, finely ground and sifted. See **MEAL**.

The grain itself is not only subject to be eaten by insects in that state; but, when ground into flour, it gives birth to another race of destroyers, who eat it unmercifully, and increase so fast in it, that it is not long before they wholly destroy the substance. The finest flour is most liable to breed these, especially when stale or ill prepared. In this case, if it be examined in a good light, it will be observed to be in continual motion, and on a nicer inspection there will be found in it a great number of little animals of the colour of the flour, and very nimble. If a little of this flour is laid on the plate of the double microscope, the insects are very distinctly seen in great numbers, very brisk and lively, continually crawling over one another's backs, and playing a thousand antic tricks together; whether in diversion, or in search of food, is not easy to be determined. These animals are of an oblong and slender form; their heads are furnished with a kind of trunk or hollow tube, by means of which they take in their food, and their body is composed of several rings. They do vast mischief among magazines of flour laid up for armies and other public uses. When they have once taken possession of a parcel of this valuable commodity, it is impossible to drive them out; and they increase so fast, that the only method of preventing the total loss of the parcel is to make it up into bread as soon as can be done. The way to prevent their breeding in the flour is to preserve it from damp: nothing gets more injury by being put in damp than flour; and yet nothing is more frequently put up so. It should be always care-

fully and thoroughly dried before it is put up; and the barrels also dried in which it is to be put; then, if they are placed in a room tolerably warm and dry, they will keep it well. Too dry a place never does flour any hurt, though one too moist almost always spoils it.

Flour when carefully analysed, is found to be composed of three very different substance. The first and most abundant is pure *starch*, or white *fecule*, insoluble in cold but soluble in hot water, and of the nature of mucous substances; which when dissolved, form water-glues. The second is the *gluten*, most of whose properties have been described under the article **BREAD**. The third is of a mild nature, perfectly soluble in cold water, of the nature of *saccharine* extractive mucous matters. It is susceptible of the spirituous fermentation, and is found but in small quantity in the flower of wheat. See **BREAD, GLUTEN, STARCH, and SUGAR**.

FLOWER FLOS, among botanists and gardeners, the most beautiful parts of trees and plants, containing the organs or parts of fructification. See **BOTANY**, p. 427—429, and explanation of Plate CIII. in p. 439, col. 1. See also p. 441, col. 1.

Flowers designed for medicinal use, should be plucked when they are moderately blown, and on a clear day before noon; for conserves, roses must be taken in the bud.

FLOWERS, in antiquity. We find flowers in great request at the entertainment of the ancients, being provided by the master of the feast, and brought in before the second course; or as some are of opinion, at the beginning of the entertainment. They not only adorned their heads, necks, and breasts, with flowers, but often bestrewed the beds whereon they lay, and all parts of the room with them. But the head was chiefly regarded. See **GARLAND**.

Flowers were likewise used in the bedecking of tombs. See **BURIAL**.

Eternal FLOWER. See **XERANTHEMUM**.

Everlasting FLOWER. See **GNAPHALIUM**.

FLOWER-Fence. See **POINCIANA**.

Sun-FLOWER. See **HELIANTHUS**.

Sultan-FLOWER. See **CYANUS**.

Trumpet-FLOWER. See **BIGNONIA**.

Wind-FLOWER. See **ANEMONE**.

FLOWER-de-lis, or *FLOWER-de-luce*, in heraldry, a bearing representing the lily, called the *queen of flowers*, and the true hieroglyphic of royal majesty; but of late it is become more common, being borne in some coats one, in others three, in others five, and in some *semee* or spread all over the escutcheon in great numbers.

The arms of France are, three flower-de-lis or, in a field azure.

FLOWER de Luce. See **IRIS**.

FLOWERS, in heraldry. They are much used in coats of arms: and in general signify hope, or denote human frailty and momentary prosperity.

FLOWERS, in chemistry. By this name are generally understood bodies reduced into very fine parts, either spontaneously, or by some operation of art; but the term is chiefly applied to volatile solid substances, reduced into very fine parts, or into a kind of meal by sublimation.—Some flowers are nothing else than the bodies themselves, which are sublimed entire, without suffering

Flower.

Flowers. suffering any alteration or decomposition; and other flowers are some of the constituent parts of the body subjected to sublimation.

Colours of FLOWERS. See the article *COLOUR (of Plants)*.

Colours extracted from FLOWERS. See *Colour-Making*, n^o 35, 40.

Preserving of FLOWERS. The method of preserving flowers in their natural beauty through the whole year has been much sought after by many people. Some have attempted it by gathering them when dry and not too much opened, and burying them in dry sand; but this, though it preserves their figure well, takes off from the liveliness of their colour. Muntingius prefers the following method to all others. Gather roses, or other flowers when they are not yet thoroughly open, in the middle of a dry day: put them into a good earthen vessel glazed within; fill the vessel up to the top with them; and when full sprinkle them over with some good French wine, with a little salt in it; then set them by in a cellar, tying down the mouth of the pot. After this they may be taken out at pleasure; and, on setting them in the sun, or within reach of the fire, they will open as if growing naturally; and not only the colour, but the smell also will be preserved.

The flowers of plants are by much the most difficult parts of them to preserve in any tolerable degree of perfection; of which we have instances in all the collections of dried plants, or *herbaria sicci*. In these the leaves, stalks, roots, and seeds of the plants appear very well preserved; the strong texture of these parts making them always retain their natural form, and the colours in many species naturally remaining. But where these fade, the plant is little the worse for use as to the knowing the species by it. But it is very much otherwise in regard to flowers: these are naturally by much the most beautiful parts of the plants to which they belong; but they are so much injured in the common way of drying, that they not only lose, but change their colours one into another, by which means they give a handle to many errors; and they usually also wither up, so as to lose their very form and natural shape. The primrose and cowslip kinds are very eminent instances of the change of colours in the flowers of dried specimens: for those of this class of plants easily dry in their natural shape; but they lose their yellow, and, instead of it, acquire a fine green colour, much superior to that of the leaves in their most perfect state. The flowers of all the violet kind lose their beautiful blue, and become of a dead white: so that in dried specimens there is no difference between the blue-flowered violet and the white-flowered kinds.

Sir Robert Southwell has communicated to the world a method of drying plants, by which this defect is proposed to be in a great measure remedied, and all flowers preserved in their natural shape, and many in their natural colours. For this purpose two plates of iron are to be prepared of the size of a large half-sheet of paper, or larger, for particular occasions: these plates must be made so thick as not to be apt to bend; and there must be a hole made near every corner for the receiving a screw to fasten them close together. When these plates are prepared, lay in readiness several sheets of paper, and then gather the plants with

their flowers when they are quite perfect. Let this be always done in the middle of a dry day; and then lay the plant and its flower on one of the sheets of paper doubled in half, spreading out all the leaves and petals as nicely as possible. If the stalk is thick, it must be pared or cut in half so that it may lie flat; and if it is woody, it may be peeled, and only the bark left. When the plant is thus expanded, lay round about it some loose leaves and petals of the flower, which may serve to complete any part that is deficient. When all is thus prepared, lay several sheets of paper over the plant, and as many under it; then put the whole between the iron plates, laying the papers smoothly on one, and laying the other evenly over them: screw them close, and put them into an oven after the bread is drawn, and let them lie there two hours. After that, make a mixture of equal parts of aquafortis and common brandy; shake these well together, and when the flowers are taken out of the pressure of the plates, rub them lightly over with a camel's-hair pencil dipped in this liquor; then lay them upon fresh brown paper, and covering them with some other sheets, press them between this and other papers with a handkerchief till the wet of these liquors is dried wholly away. When the plant is thus far prepared, take the bulk of a nutmeg of gum-dragon; put this into a pint of fair water cold, and let it stand 24 hours; it will in this time be wholly dissolved: then dip a fine hair-pencil in this liquor, and with it daub over the backsides of the leaves, and lay them carefully down on half a sheet of white paper fairly expanded, and press them down with some more papers over these. When the gum-water is fixed, let the pressure and papers be removed, and the whole work is finished. The leaves retain their verdure in this case, and the flowers usually keep their natural colours. Some care, however, must be taken, that the heat of the oven be not too great. When the flowers are thick and bulky, some art may be used to pare off their backs, and dispose the petals in a due order; and after this, if any of them are wanting, their places may be supplied with some of the supernumerary ones dried on purpose; and if any of them are only faded, it will be prudent to take them away, and lay down others in their stead: the leaves may be also disposed and mended in the same manner.

Another method of preserving both flowers and fruit found throughout the whole year is also given by the same author. Take saltpetre one pound; armenian bole, two pounds; clean common sand, three pounds. Mix all well together; then gather fruit of any kind that is not fully ripe, with the stalk to each; put these in, one by one, into a wide-mouthed glass, laying them in good order. Tie over the top with an oil-cloth, and carry them into a dry cellar, and set the whole upon a bed of the prepared matter of four inches thick in a box. Fill up the remainder of the box with the same preparation; and let it be four inches thick all over the top of the glass, and all around its sides. Flowers are to be preserved in the same sorts of glasses, and in the same manner; and they may be taken up after a whole year as plump and fair as when they were buried.

FLOWERS (artificial) of the Chinese. See *TONG-TSAO*.

FLOWERS,

Flowers, Flowering. FLOWERS, in chemistry, are the finest and most subtile parts of dry bodies, raised by fire, into the vessel's head and aludels; and adhering to them in form of a fine powder or dust. Such are the flowers of sulphur, benjamin, &c.

FLOWERS, in the animal economy, denote women's monthly purgations or menses.—Nicod derives the word in this sense from *fluere*, q. d. *fluors*. Others will have the name occasioned hence, that women do not conceive till they have had their flowers; so that these are a sort of forerunners of their fruits.

FLOWERS, in rhetoric, are figures or ornaments of discourse, by the Latins called *flosculi*.

FLOWERING of Bulbous PLANTS. These plants will grow and flower in water alone, without any earth, and make a very elegant appearance. We daily see this practised in single roots; but there is a method of doing it with several roots in the same vessel. Take a common small garden-pot; stop the hole at the bottom with a cork, and lute in the cork with putty, that no water can get through; then fit a board to the top of the pot, and bore six or seven holes in it at equal distances, to place the bulbs in; and as many smaller ones near them to receive sticks, which will serve to tie up the flowers. Then fill up the pot with water to the board; and place tulips, jonquils, narcissus's, and the like plants in the root upon the holes, so that the bottom of the roots may touch the water: thus will they all flower early in the season, and be much more beautiful than any pot of gathered flowers, and will last many weeks in their full perfection. After the season of flowering is over, the roots will gradually shrink thro' the holes of the board, and get loose into the water: but, instead of being spoiled there, they will soon increase in size; so that they cannot return through the holes, and will produce several off-sets. It is natural to try from this the consequence of keeping the roots under water during the whole time of their blowing; and in this way they have been found to succeed very well, and flower even stronger and more beautifully than when in the ground. They may thus, also, with proper care in the degree of heat in the room, be kept flowering from before Christmas till March and April. It is not easy, in this last manner, to manage the keeping the boards under water, for which reason, it is better to procure some sheet-lead of about four pounds to the foot, and cut this to the size of the mouth of the pot. In this there should be bored holes for the bulbs, and other holes for the sticks: and, in order to keep the sticks quite firm, it is proper to have another plate of lead shaped to the bottom of the pot, with holes in it, answering to those of the upper plate made for the sticks. The sticks will by this means be always kept perfectly steady; and the roots, being kept under water by the upper plate of lead, will flower in the most vigorous and beautiful manner imaginable.

Some have thought of adding to the virtues of the water by putting in nitre in small quantities, and others have added earth and sand at the bottom; but it has always been found to succeed better without any addition.

It may be more agreeable to some to use glass jars in this last method with the leads, instead of earthen pots. The bulbs succeed full as well as these; and there is this advantage, that the progress of the roots

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is seen all the while, and they are managed better as to Flowering: the supply of water.

By repeated experiments in this way on dried bulbs, and on those taken fresh out of the ground, the former have been found to succeed the best. For those taken fresh out of the ground being full of moisture, will not so soon, upon changing their element, be nourished fully by a new one; and the fibres which they had struck in the ground, always rot when put into the water, and new ones must be formed in their places; so that it requires more time for them to come to flowering. The bulbs themselves will not rot in this manner; but they will never be so strong as those which were put into the water dry, which gradually fill themselves with moisture from it, and regularly plump up. The best method of managing the whole process is this: Place the bulbs at first only on the surface of the water; for thus they will strike out their fibres most strongly. When they have stood thus six weeks, pour in the water so high as to cover them entirely, and keep them thus till they have done flowering.

Sometimes the roots will become mouldy in several parts while they stand above the water, and the clearing them of it is to no purpose; for it will eat and spread the farther, and frequently eat through two or three of their coats. In this case they must be immediately covered with water; when the mould will be stopped, and the roots become sound, and flower as well as those which never had any such distemper. If the roots are suffered to remain in water all the year, they will not decay; but will flower again at their proper season, and that as vigorously as those which have been taken out and dried. The old fibres of those roots never rot till they are ready to push forth new ones. It is found by experience that the hyacinth, and many other plants, grow to a greater degree of perfection when thus in water than when in the ground. There is a peculiar species of hyacinth called *Keyser's jewel*; this never, or very rarely, produces seed-vessels in the common way of flowering in the ground; but it will often produce some pods when blown in water.

Mr Millar has intimated, in the Philosophical Transactions, that bulbs set in glasses grow weaker, and should be renewed every other year: but it is found that, when managed in this manner, and kept under water, at the time of taking them up, they are as large, and some of them larger, than when planted; and if these be dried at a proper season, they will flower, year after year, as well as fresh ones.

Ranunculus and anemone roots have been found to shoot up their stalks very well in this way; but the flowers are usually blasted, which seems to arise from want of free air. Pinks will flower very well in this manner; auriculas also may, with care, be brought to flower, but not strongly. Roses, jessamines, and honeysuckles, may also be made to flower this way, and will thrive and send out suckers; the best pieces to plant, are suckers cut off about three inches under ground, without any fibres. The succulent plants may also be raised this way; for instance, the opuntia or Indian fig. If a fragment of a leaf of this plant be cut, and laid by to dry for a month till it is an absolute skin, as soon as it is put in this manner into water, it begins

Qq

gins

Flowering. gins to plump up, and soon sends out fibrous roots, and produces new leaves as quickly as it would do in the ground.

This the more singular in these sort of plants, because in their natural state in the ground, they cannot bear much water. This method of growing in water is not peculiar to the bulbous-rooted ones, but others may even be raised from seed by it. A bean or pea, set in this manner, will grow up to its proper standard, and will flower and produce pods which will ripen their seed. The smaller seeds may be also raised in this manner, by the help of wool to support them.

No vegetable transplanted out of the earth into water will thrive kindly; but any plant, whether raised from the root or seed in water, may be transplanted to the earth, and will succeed very well. It may be possible, therefore, from this method of raising plants in water, to come at a better way than is usually practised of raising some roots in the earth which are subject to rot there; such as anemonies, ranunculuses, and hyacinths. A bulb dropped by chance upon the ground, will strike out both stronger and more numerous fibres than those which are planted in the usual way in the ground. On this principle, it may be proper to take out the earth of the bed where the bulbs are to stand at the time of planting them, to such a depth as they are to be placed under it when set for flowering. The bulbs are then to be set in their places, on the surface of this low ground; and to stand there till they have shot out their fibres and their head: then the earth is to be added over them by degrees, till they are covered as high above the head as they are in the usual manner of planting them: thus they would be preserved from the danger of rotting; and their fibres would be much stronger, and consequently they would draw more nourishment, and flower better, than in the common way. The common method of planting these roots renders them liable to be destroyed by either extreme of a wet or a dry season. In the first case, they immediately rot by the abundant moisture they receive; and, in the second, they become dry as a stick, and mouldy; so that they are infallibly rotted by the first rain that falls afterwards.

The directions necessary to the success of the bulbs planted in water are these. When the leaden false bottoms are fixed down tight within two or three inches of the bottom of the vessel (which is only designed to hold the sticks steady which are to support the leaves and stalks), then lay on the lead upon which the bulbs are to rest, placing the notched part opposite to that in the false bottom, as near as the sticks, when placed, will suffer it; then place the bulbs one in each hole, and fill up with water to the upper lead. The bottom of the bulb will then touch the water; and as the water diminishes in quantity, keep it supplied with more up to the same height for a month or six weeks; in which time the bulbs will have shot strong fibres. Then fill up the water about half an inch above the surface of the lead; and, by degrees, as the fibres strengthen, and the plume shoots from the head, keep the water higher and higher, till at length the whole bulb is covered. The water is to be kept at this standard till the season for drying them returns.—At the time of planting the bulbs, they must

be carefully cleaned from any foulnesses at the bottom, by scraping them with the point of a knife till the sound part of the bulb appears; clear them likewise from any loose skins, and even take off their brown skin till they appear white; otherwise this brown skin will tinge the water, and the growth will not succeed so well.

The notches in the side of each lead are intended to give easy passage to the water, that, if there should be any foulness or sediment in it, on shaking it a little it may all run through, and fresh water be put in its place. But this shifting the water need not be done more than once or twice in a winter, as there may be occasion from the foulness; and when this is done, the sides of the vessel should be cleaned with a painter's brush, and rinsed out again, and the bulbs themselves washed, by pouring water on them at a little distance.

At any time when the outer skins of the bulbs dry, they are to be peeled off, that they may not occasion foulness in the water; and if any dust or foul matter be at any time observed swimming on the surface, the method is to fill up the pot or vessel to the rim, and let it run over: this will carry off that light foulness, and the water may afterwards be poured away to the proper standard.

Bulbs of equal bigness should be planted together in the same pot, that they may all have the same benefit of the water. Narcissuses and hyacinths do well together; as also tulips and jonquils, and crocuses and snow-drops.

FLUDD (Robert), a famous philosopher, born in 1574. He was fellow of the college of physicians in London, and became a most voluminous writer: he doated greatly on the wonders of chemistry; was a zealous brother of the Rosicrucian order; and his books which are mostly in Latin, are as dark and mysterious in their language as in their matter. He died in 1637.

FLUID, an appellation given to all bodies whose particles easily yield to the least partial pressure, or force impressed. For the

Laws and properties of FLUIDS. See HYDROSTATICS.

There are various kinds of animalcules to be discerned in different fluids by the microscope. Of many remarkable kinds of these, a description is given under the article ANIMALCULE. All of these little creatures are easily destroyed by separating them from their natural element. Naturalists have even fallen upon shorter methods. A needle-point, dipped in spirit of vitriol, and then immersed into a drop of pepper-water, readily kills all the animalcules; which, though before frisking about with great liveliness and activity, no sooner come within the influence of the acid particles, than they spread themselves, and tumble down to all appearance dead. The like may be done by a solution of salt; only with this difference, that, by the latter application, they seem to grow vertiginous, turning round and round till they fall down. Tincture of salt of tartar, used in the same manner, kills them still more readily; yet not so, but there will be apparent marks of their being first sick and convulsed. Inks destroy them as fast as spirit of vitriol, and human blood produces the same effect. Urine, sack, and sugar, all destroy them, though not so fast; besides, that there is some

*Flowering
Fluid.*

Fluid.

some diversity in their figures and appearances, as they receive their deaths from this poison or that. The point of a pin dipped in spittle, presently killed all the kinds of animalcules in puddle-water, as Mr. Harris supposes it will other animalcules of this kind.

All who are acquainted with microscopic observations, know very well, that in winter, in which the best glasses can discover no particle of animated matter, after a few grains of pepper, or a fragment of a plant of almost any kind, has been some time in it, animals full of life and motion are produced; and those in such numbers, as to equal the fluid itself in quantity.—When we see a numerous brood of young fishes in a pond, we make no doubt of their having owed their origin to the spawn, that is, to the eggs of the parents of the same species. What are we then to think of these? If we will consider the progress of nature in the insect tribes in general, and especially in such of them as are most analogous to these, we shall find it less difficult to give an account of their origin than might have been imagined.

A small quantity of water taken from any ditch in the summer months, is found to be full of little worms, seeming in nothing so much as in size to differ from the microscopic animalcules. Nay, water, without these, exposed in open vessels to the heat of the weather, will be always found to abound with multitudes of them, visible to the naked eye, and full of life and motion. These we know, by their future changes, are the fly-worms of the different species of gnats, and multitudes of other fly-species; and we can easily determine, that they have owed their origin only to the eggs of the parent-fly there deposited. Nay, a closer observation will at any time give ocular proof of this; as the flies may be seen laying their eggs there, and the eggs may be followed through all their changes to the fly again. Why then are we to doubt that the air abounds with other flies and animalcules as minute as the worms in those fluids; and that these last are only the fly-worms of the former, which after a proper time spent in that state, will suffer changes like those of the larger kinds, and become flies like those to whose eggs they owed their origin? *Vid. Reaumur. Hist. Insect. vol. iv. p. 431.*

The differently medicated liquors made by infusions of different plants, afford a proper matter for the worms of different species of these small flies: and there is no reason to doubt, but that among these some are, viviparous, others oviparous; and to this may be, in a great measure, owing the different time taken up for the production of these insects in different fluids. Those which are a proper matter for the worms of the viviparous fly, may be soonest found full of them; as probably, the liquor is no sooner in a state to afford them proper nourishment, than their parents place them there: whereas those produced from the eggs of the little oviparous flies, must, after the liquor is in a proper state, and they are deposited in it in the form of eggs, have a proper time to be hatched, before they can appear alive.

It is easy to prove, that the animals we find in these vegetable infusions were brought thither from elsewhere. It is not less easy to prove, that they could not be in the matter infused any more than in the water in which it is infused.

Fluid.

Notwithstanding the fabulous accounts of salamanders, it is now well known, that no animal, large or small, can bear the force of fire for any considerable time; and, by parity of reason; we are not to believe, that any insect, or embryo insect, in any state, can bear the heat of boiling water for many minutes. To proceed to enquiries on this foundation: If several tubes filled with water, with a small quantity of vegetable matter, such as pepper, oak-bark, truffles, &c. in which, after a time, insects will be discovered by the microscope; and other like tubes be filled with simple water boiled, with water and pepper boiled together, and with water with the two other ingredients, all separately boiled in it; when all these liquors come to a proper time for the observation of the microscope, all, as well those which have been boiled as those which have not, will be found equally to abound with insects; and those of the same kind, in infusions of the same kind, whether boiled or not boiled. Those in the infusions which had sustained a heat capable of destroying animal life, must therefore not have subsisted either in the water or in the matters put into it, but must have been brought thither after the boiling; and it seems by no way so probably, as by means of some little winged inhabitants of the air depositing their eggs or worms in these fluids.

On this it is natural to ask, how it comes to pass, that while we see myriads of the progeny of these winged insects in water, we never see themselves? The answer is equally easy, viz. because we can always place a drop of this water immediately before the focus of the microscope, and keep it there while we are at leisure to examine its contents; but that is not the case with regard to the air inhabited by the parent flies of these worms, which is an immense extent in proportion to the water proper for nourishing these worms; and consequently, while the latter are clustered together in heaps, the former may be dispersed and scattered. Nor do we want instances of this, even in insects of a larger kind. In many of our gardens, we frequently find vessels of water filled with worms of the gnat kind, as plentifully, in proportion to their size, as those of other fluids are with animalcules. Every cubic inch of water in these vessels contains many hundreds of animals; yet we see many cubic inches of air in the garden not affording one of the parent flies.

But neither are we positively to declare that the parent flies of these animalcules are in all states wholly invisible to us; if not singly to be seen, there are some strong reasons to imagine that they may in great clusters. Every one has seen in a clear day, when looking stedfastly at the sky, that the air is in many places disturbed by motions and convolutions in certain spots. These cannot be the effects of imagination, or of faults in our eyes, because they appear the same to all; and if we consider what would be the case to an eye formed in such a manner as to see nothing smaller than an ox, on viewing the air on a marsh fully peopled with gnats, we must be sensible, that the clouds of these insects, though to us distinctly enough visible, would appear to such an eye merely as the moving parcels of air in the former instance do to us: and surely it is thence no rash conclusion to infer, that the case may be the same, and that myriads of flying insects,

Fluid sects, too small to be singly the objects of our view, yet are to us what the clouds of gnats would be in the former case.

Nervous FLUID. See ANATOMY, p. 761. col. 2.

Elastic FLUIDS. See AEROLOGY, AIR, FIXED Air, GAS, VAPOUR, &c.

FLUIDITY, is by Sir Isaac Newton defined to be, that property of bodies by which they yield to any force impressed, and which have their parts very easily moved among one another.

To this definition some have added, that the parts of a fluid are in a continual motion. This opinion is supported by the solution of salts, and the formation of tinctures. If a small bit of saffron is thrown into a phial full of water, a yellow tincture will soon be communicated to the water to a considerable height, though the phial is allowed to remain at rest; which indicates a motion in those parts of the fluid which touch the saffron, by which its colouring matter is carried up.

With regard to water, this can scarce be denied; the constant exhalations from its surface show, that there must be a perpetual motion in its parts from the ascent of the steam through it. In mercury, where insensible evaporation does not take place, it might be doubted; and accordingly the Newtonian philosophers in general have been of opinion, that there are some substances essentially fluid, from the spherical figure of their constituent particles. The congelation of mercury, however, by an extreme degree of cold*, demonstrates that fluidity is not essentially inherent in mercury more than in other bodies.

*See Congelation.

That fluids have vacuities in their substance is evident, because they may be made to dissolve certain bodies without sensibly increasing their bulk. For example, water will dissolve a certain quantity of salt; after which it will receive a little sugar, and after that a little allum, without increasing its first dimensions. Here we can scarce suppose any thing else than that the saline particles were interposed between those of the fluid; and, as by the mixture of salt and water, a considerable degree of cold is produced, we may thence easily see why the fluid receives these substances without any increase of bulk. All substances are expanded by heat, and reduced into less dimensions by cold; therefore, if any substance is added to a fluid, which tends to make it cold, the expansion by the bulk of the substance added, will not be so much perceived as if this effect had not happened; and if the quantity added be small, the fluid will contract as much, perhaps more, from the cold produced by the mixture, than it will be expanded from the bulk of the salt. This also may let us know with what these interstices between the particles of the fluid were filled up; namely, the element of fire or heat. The saline particles, upon their solution in the fluid, have occupied these spaces; and now the liquor, being deprived of a quantity of this element equal in bulk to the salt added, feels sensibly colder.

As, therefore, there is scarce any body to be found, but what may become solid by a sufficient degree of cold, and none but what a certain degree of heat will render fluid; the opinion naturally arises, that fire is the cause of fluidity in all bodies, and that this element is the only essentially fluid substance in nature.

Hence we may conclude, that those substances which we call *fluids* are not essentially so, but only assume that appearance in consequence of an intimate union with the element of fire; just as gums assume a fluid appearance on being dissolved in spirit of wine, or salts in water.

Fluidity
||
Flummery.

Upon these principles Dr Black mentions fluidity as an effect of heat*. The different degrees of heat which are required to bring different bodies into a state of fluidity, he supposes to depend on some particulars in the mixture and composition of the bodies themselves: which becomes extremely probable, from considering that we change the natural state of bodies in this respect, by certain mixtures; thus, if two metals are compounded, the mixture is usually more fusible than either of them separately. See CHEMISTRY, n° 542.

*See Chemistry, n° 115, 117, 119.

It is certain, however, that water becomes warmer by being converted into ice†; which may seem contradictory to this opinion. To this, however, the Doctor replies, that fluidity does not consist in the degree of sensible heat contained in bodies, which will affect the hand or a thermometer; but in a certain quantity which remains in a latent state‡. This opinion he supports from the great length of time required to melt ice; and to ascertain the degree of heat requisite to keep water in a fluid state, he put five ounces of water into a Florence flask, and converted it into ice by means of a freezing mixture put round the flask. Into another flask of the same kind he put an equal quantity of water cooled down nearly to the freezing point, by mixing it with snow, and then pouring it off. In this he placed a very delicate thermometer; and found that it acquired heat from the air of the room in which it was placed: seven degrees of heat were gained the first half hour. The ice being exposed to the same degree of heat, namely, the air of a large room without fire, it cannot be doubted that it received heat from the air as fast as the water which was not frozen: but, to prevent all possibility of deception, he put his hand under the flask containing the ice, and found a stream of cold air very sensibly descending from it, even at a considerable distance from the flask; which undeniably proved, that the ice was all that time absorbing heat from the air. Nevertheless, it was not till 11 hours that the ice was half-melted, though in that time it had absorbed so much heat as ought to have raised the thermometer to 140°; and even after it was melted, the temperature of the water was found scarce above the freezing point: so that, as the heat which entered could not be found in the melted ice, he concluded that it remained concealed in the water, as an essential ingredient of its composition. See CONGELATION.

†See Congelation.

‡See Evaporation.

FLUKE, or **FLOUNDER**, in ichthyology. See PLEURONECTES.

FLUKE-Worm. See FASCIOLA.

FLUKE of an Anchor, that part of it which fastens in the ground. See ANCHOR.

FLUMMERY, a wholesome sort of jelly made of oat-meal.

The manner of preparing it is as follows. Put three large handfuls of finely ground oat-meal to steep, for 24 hours, in two quarts of fair water: then pour off the clear water, and put two quarts of fresh water to it:

Flour.

it : strain it through a fine hair-sieve, putting in two spoonfuls of orange-flower water and a spoonful of sugar: boil it till it is as thick as a hasty-pudding, stirring it continually while it is boiling, that it may be very smooth.

FLUOR, in physics, a fluid; or, more properly, the state of a body that was before hard or solid, but is now reduced by fusion or fire into a state of fluidity.

FLOUR Acid. See CHEMISTRY-Index

FLOUR Albus. See MEDICINE-Index.

FLOUR-Spar, or *Blue-John*, called also fluxing spars, vitrescent or glass spars, are a genus of fossils composed of calcareous earth united with an acid of a peculiar kind, of which an account is given under CHEMISTRY; see that article, per Index at *Fluor acid*.

They are little harder than common calcareous spars, and do not strike fire with steel; nor do they effervesce with acids either before or after calcination. When exposed to a strong fire, they crack and split in pieces, but do not melt without a violent heat. Engenstroom informs us, that all of them which he tried melted pretty easily before the blow-pipe; but he was obliged to take great care to prevent them from flying away before they were thoroughly heated. Their specific gravity is from 3144 to 3175. Notwithstanding the difficulty with which they are fused by themselves however, they melt very readily in conjunction with other earths; running into a corrosive glass which dissolves the strongest crucibles, unless some quartz or fire-clay be mixed in their composition. When gradually heated, they give a phosphorescent light; but lose this property when made red-hot. Those which are coloured, particularly the green ones, give the strongest light. They melt easily with borax, and next to that with the microcosmic salt, neither of them making any effervescence. They dissolve in acids when boiling, particularly aqua-regia; and the solutions are precipitated by an alkali even though cold, but not so completely. M. Magellan informs us, that he has frequently dissolved them in boiling vitriolic acid in order to get that of fluor in an aerial state. There are three species.

1. The indurated fluor is solid, and of an indeterminate figure, of a dull texture, semitransparent, and full of cracks in the rock. It is of a white colour.

2. Sparry fluor. This has nearly the figure of spar; though, on close observation, it is found less regular; nothing but its glossy surface giving it the resemblance of spar. It is found of various colours, viz. white, blue, green, pale-green, violet, and yellow.

3. The crystallized fluor is of four kinds. 1. Having an irregular figure, of a white, blue, or red colour. 2. Crystallized in cubes, of a yellow or violet colour. 3. Of a polygonal spherical figure, white or blue coloured. 4. Of an octoedral figure, clear and colourless.

The principal use of fluors is for smelting ores, where they act as very powerful fluxes, and on this account are much valued. They are found in various countries, particularly Sweden, and some other northern countries of Europe. From this quality of melting easily in combination with other earthy matters, they have got the name of *fluors*. "The resemblance between the coloured fluors and the compositions made of coloured glass (says Cronstedt), has perhaps contributed not only to the fluors being

reckoned of the same value with the coloured quartz crystals, by such collectors as only mind colour and figure, but to their also obtaining a rank among the precious stones in the apothecaries and druggists shops."

M. Fabroni observes, that this combination of calcareous earth with the sparry acid is almost always transparent: it often crystallizes in regular cubes, sometimes single from one line to two inches in diameter, and sometimes of an indeterminate figure. They are sometimes of a blue colour; others are purple like amethysts; some are of a brown colour, others opaque. M. Magellan says, that fluors in general have this singular property, that on being melted by the flame of the blow-pipe, together with gypsum, the lead resulting from both is all formed with facets on the outside; but if melted with terra ponderosa, its surface is quite round or spherical.

M. Margraaf has made experiments in order to discover the nature of these stones. He ascertained the abovementioned distinctions between them and the gypseous spars; and therefore infers, that they are not compounded of vitriolic acid with calcareous earth. He observed singular appearances on mixing them with vitriolic and other acids, and subjecting the mixtures to distillation.

Eight ounces of the powder of a green fluor being mixed with an equal weight of pure oil of vitriol, and distilled together with a graduated heat, yielded, after the watery part of the acid had passed, a fine white sublimate, which arose and adhered to the neck of the retort, and even passed into the receiver. The first parts of this sublimate which arose appeared like butter of antimony; and, like this butter, they melted by the heat of a live coal brought near the neck of the retort: but the parts which arose towards the end of the operation, with the greatest degree of heat, could not be melted by that heat. The retort being broken, a residuum was found weighing 12 oz. Hence 4 oz. of oil of vitriol remained united with the spar. The bottom of the retort was observed to be pierced with holes. Lastly, the liquor which had passed into the receiver and the white sublimate, had very sensibly a sulphureous smell. The sublimate, triturated a long time in a mortar with hot distilled water, dissolved, and passed thro' a filter. To the filtrated liquor some fixed alkali being added, a precipitate was formed; which being well washed and dried, was readily melted by fire into a mass resembling porcelain. The same excellent and accurate chemist produced the same effects upon this stone, by substituting, instead of the vitriolic acid, the nitrous, marine, phosphoric, or the concentrated acetic acids.

FLUOR Albus or Uterinus, in medicine, a kind of flux incident to women, popularly called the *whites*. See MEDICINE-Index.

FLUSHING, an handsome, strong, and considerable town of the United Provinces, in Zealand, and in the island of Walcheren, with a very good harbour, and a great foreign trade. It was put into the hands of queen Elizabeth for a pledge of their fidelity, and as a security for the money she advanced. It is one of the three places which Charles V. advised Philip II. to preserve with care. E. Long. 3. 32. N. Lat. 51. 26.

FLUTE, an instrument of music, the simplest of all those of the wind kind. It is played on by blowing it

Fluor

Fute

Flute. it with the mouth; and the tones or notes are changed by stopping and opening the holes disposed for that purpose along its side.

This is a very ancient instrument. It was at first called the flute *a bee*, from *bec* an old Gaulish word signifying the beak of a bird or fowl, but more especially of a cock; the term *flute à bec* must therefore signify the beaked flute; which appears very proper, on comparing it with the traverse or German flute. The word *flute* is derived from *fluta*, the Latin for a lamprey or small eel taken in the Sicilian seas, having seven holes immediately below the gills on each side, the precise number of those in the front of the flute.

By Mersennus this instrument is called the *fistuladulcis*, seu *Anglica*; the lowest note, according to him, for the treble flute, is *C faut*, and the compass of the instrument 15 notes. There is, however a flute known by the name of the *concert flute*, the lowest note of which is F. Indeed, ever since the introduction of the flute into concerts, the lowest note of the instrument, of what size soever it is, has been called F; when in truth its pitch is determinable only by its correspondence in respect of acuteness or gravity with one or other of the chords in the *scala maxima* or great system.

Besides the true concert-flute, others of a less size were soon introduced into concerts of violins; in which case the method was to write the flute-part in a key correspondent to its pitch. This practice was introduced in 1710 by one Woodcock, a celebrated performer on this instrument, and William Babel organist of the church of All-hallows, Bread Street, London. They failed, however, in procuring for the flute a reception into concerts of various instruments; for which reason, one Thomas Stanesby, a very curious maker of flutes and other instruments of the like kind, about the year 1732, adverting to the scale of Mersennus, in which the lowest note was C, invented what he called the *new system*; in which, by making the flute of such a size as to be a fifth above concert pitch, the lowest note became *C sol fa ut*. By this contrivance the necessity of transposing the flute part was taken away; for a flute of this size, adjusted to the system abovementioned, became an octave to the violin. To further this invention of Stanesby, one Lewis Mercier, an excellent performer on the flute, published, about the year 1735, six solos for this instrument, three of which are said to be accommodated to Mr Stanesby's new system; but the German flute was now become a favourite instrument, and Stanesby's ingenuity failed of its effect.—One great objection indeed lies against this instrument, which, however, equally affects all perforated pipes; namely, that they are never perfectly in tune, or cannot be made to play all their notes with equal exactness. The utmost that the makers of them can do is to tune them to some one key; as the hautboy to C, the German flute to D, and the English flute to F; and to effect this truly is a matter of no small difficulty. The English flutes made by the younger Stanesby came the nearest of any to perfection; but those of Bressian, though excellent in their tone, are all too flat in the upper octave. For these reasons some are induced to think, that the utmost degree of proficiency on any of those instruments is not worth the labour of attaining it.

German FLUTE, is an instrument entirely different from the common flute. It is not, like that, put into the mouth to be played; but the end is stoped with a stoppion or plug, and the lower lip is applied to a hole about two inches and a half or three inches distant from the end. This instrument is usually about a foot and a half long; rather bigger at the upper end than the lower; and perforated with holes, besides that for the mouth, the lowest of which is stoped and opened by the little finger's pressing on a brass or sometimes a silver key, like those in hautboys, bassoons, &c. Its sound is exceeding sweet and agreeable; and serves as a treble in a concert.

FLUTE, or *FLUTT*, is a kind of long vessel, with flat ribs or floor-timbers, round behind, and swelled in the middle; serving chiefly for the carrying of provisions in fleets or squadrons of ships; though it is often used in merchandize. The word *flute*, taken for a sort of boat or vessel, is derived, according to Borel, from the ancient *flotte*, a little boat. In the verbal process of the miracles of St Catherine of Sweden, in the 12th century, we read *Unus equum suum una cum mercibus magni ponderis introduxit super instrumentum lignis fabricatum, vulgariter dictum fluta*. Upon which the Bollandists observe, that in some copies it is read *flotta*, an instrument called by the Laints *ratis*; and that the word *flutta* or *flotta* arose from *flotten* or *vlootten*, "to float."

FLUTES, or *FLUTINGS*, in architecture, are perpendicular channels or cavities cut along the shaft of a column or pilaster. They are supposed to have been first introduced in imitation of the plaits of womens robes; and are therefore called by the Latins *strigæ* and *rugæ*. The French call them *cannelures*, as being excavations; and we, *flutes* or *flutings*, as bearing some resemblance to the musical instrument so called. They are chiefly affected in the Ionic order, in which they had their first rise; though they are also used in all the richer orders, as the Corinthian and Composite; but rarely in the Doric, and scarce ever in the Tuscan.

FLUX, in medicine, an extraordinary issue or evacuation of some humour. Fluxes are various and variously denominated according to their seats or the humours thus voided; as a flux of the belly, uterine flux, hepatic flux, salival flux, &c. The flux of the belly is of four kinds, which have each their respective denominations, viz. the *lientry*, or *fluxus lientericus*; the *cæliac*, or *fluxus chylosus*; the *diarrhæa*; and the *dysentery*, or *bloody flux*;—all which are properly treated of in MEDICINE.

FLUX, in hydrography, a regular periodical motion of the sea, happening twice in 24 hours; wherein the water is raised and driven violently against the shores. The flux or flow is one of the motions of the tide; the other, whereby the water sinks and retires, is called the reflux or ebb. There is also a kind of rest or cessation of about half an hour between the flux and reflux; during which time the water is at its greatest height, called *high-water*. The flux is made by the motion of the water of the sea from the equator towards the poles; which, in its progress, striking against the coasts in its way, and meeting with opposition from them, swells, and where it can find passage, as in flats, rivers, &c. rises up and runs into the land. This motion follows, in some measure, the course of the moon;

*Flute
Flux.*

Flux.

as it looses or comes later every day by about three quarters of an hour, or more precisely, by 48 minutes; and by so much is the motion of the moon slower than that of the sun. It is always highest and greatest in full moons, particularly those of the equinoxes. In some parts, as at Mount St Michael, it rises 80 or 90 feet, though in the open sea it never rises above a foot or two; and in some places, as about the Morea, there is no flux at all. It runs up some rivers above 120 miles. Up the river Thames it only goes 80, viz. near to Kingston in Surry. Above London bridge the water flows four hours and ebbs eight; and below the bridge, flows five hours and ebbs seven.

Flux, in metallurgy, is sometimes used synonymously with fusion. For instance, an ore, or other matter, is said to be in liquid flux, when it is completely fused.

But the word flux is generally used to signify certain saline matters, which facilitate the fusion of ores, and other matters which are difficultly fusible in essays and reductions of ores. Fixed alkalis, nitre, borax, tartar, and common salt, are the saline matters of which fluxes are generally composed. But the word flux is more particularly applied to mixtures of different proportions of only nitre and tartar; and these fluxes are called by particular names according to the proportion of these ingredients, as in the following articles.

White FLUX, is made with equal parts of nitre and of tartar detonated together, by which they are alkali-fied. The residuum of this detonation is an alkali composed of the alkalis of the nitre and of the tartar, both which are absolutely of the same nature. As the proportion of nitre in this mixture is more than is sufficient to consume entirely all the inflammable matter of the tartar, the alkali remaining after the detonation is perfectly white, and is therefore called *white flux*; and as this alkali is made very quickly, it is also called *extemporaneous alkali*. When a small quantity only of white flux is made, as a few ounces for instance, some nitre always remains undecomposed, and a little of the inflammable principle of the tartar, which gives a red or even a black colour to some part of the flux; but this does not happen when a large quantity of white flux is made; because then the heat is much greater. This small quantity of undecomposed nitre and tartar

which remains in white flux is not hurtful in most of the metallic fusions in which this flux is employed: but if the flux be required perfectly pure, it might easily be disengaged from those extraneous matters by a long and strong calcination, without fusion.

Crude FLUX. By crude flux is meant the mixture of nitre and tartar in any proportions, without detonation. Thus the mixture of equal parts of the two salts used in the preparation of the white flux, or the mixture of one part of nitre and two parts of tartar for the preparation of the black flux, are each of them a crude flux before detonation. It has also been called *white flux*, from its colour: but this might occasion it to be confounded with the white flux above described. The name, therefore, of crude flux is more convenient.

Crude flux is detonated and alkali-fied during the reductions and fusions in which it is employed, and is then changed into white or black flux according to the proportion of which it is composed. This detonation produces good effects in these fusions and reductions, if the swelling and extravasation of the detonating matters be guarded against. Accordingly, crude flux may be employed successfully in many operations; as, for instance, in the ordinary operation for procuring the regulus of antimony.

Black FLUX. Black flux is produced from the mixture of two parts of tartar and one part of nitre detonated together. As the quantity of nitre which enters into the composition of this flux is not sufficient to consume all the inflammable matter of the tartar, the alkali which remains after the detonation contains much black matter, of the nature of coal, and is therefore called *black flux*.

This flux is designedly so prepared, that it shall contain a certain quantity of inflammable matter; for it is thereby capable, not only of facilitating the fusion of metallic earths like the white flux, but also of reviving these metals by its phlogiston. From this property it is also called *reducing flux*; the black flux, therefore, or crude flux made with such proportions of the ingredients as to be convertible into black flux, ought always to be used when metallic matters are at once to be fused and reduced, or even when destructive metals are to be fused, as these require a continual supply of phlogiston to prevent their calcination.

Flux.

F L U X I O N S;

A METHOD of calculation which greatly facilitates computations in the higher parts of mathematics. Sir Isaac Newton and Mr Leibnitz contended for the honour of inventing it. It is probable they had both made progress in the same discovery, unknown to each other, before there was any publication on the subject.

In this branch of mathematics, magnitudes of every kind are supposed generated by motion: a line by the motion of a point, a surface by the motion of a line, and a solid by the motion of a surface. And some part of a figure is supposed generated by an uniform motion; in consequence of which, the other parts may increase uniformly or with an accelerated or retarded motion, or may decrease in any of these ways; and

the computations are made by tracing the comparative velocities with which the parts flow.

Fig. 1. If the parallelogram ABCD be generated Plate by an uniform motion of the line AB toward CD while CXCXV. it moves from FE towards fe, while the line BF receives the increment Ff, and the figure will be increased by the parallelogram Fe; the line FE in this case undergoes no variation.

The fluxion of any magnitude at any point is the increment that it would receive in any given time, supposing it to increase uniformly from that point: and as the measures will be the same, whatever the time be, we are at liberty to suppose it less than any assigned time.

The first letters in the alphabet are used to represent

sent invariable quantities; the letters x, y, z , variable quantities; and the same letters with points over them $\dot{x}, \dot{y}, \dot{z}$, represent their fluxions.

Therefore if $AB=a$, and $BF=x$; $F\dot{f}$, the fluxion of BF , will be $\dot{x}$, and $F\dot{e}$, the fluxion of AF , $=a\dot{x}$.

If the rectangle be supposed generated by the uniform motion of FG towards CD , at the same time that HG moves uniformly towards AD , the point G keeping always on the diagonal, the lines FG, HG will flow uniformly; for while Bf receives the increment Ff , and HB the increment HK , FG will receive the increment hg , and HG the increment Gh , and they will receive equal increments in equal successive times. But the parallelogram will flow with an accelerated motion; for while F flows to f , and H to K , it is increased by the gnomon KGf ; but while F and H flow through the equal spaces fm, KL , it is increased by the gnomon Lgm greater than KGf ; consequently when fluxions of the sides of a parallelogram are uniform, the fluxion of the parallelogram increases continually.

The fluxion of the parallelogram $BHGF$ is the two parallelograms KG and Gf ; for though the parameter receives an increment of the gnomon KGf , while its sides flow to f and K , the part gG is owing to the additional velocity wherewith the parallelogram flows during that time; and therefore is no part of the measure of the fluxion, which must be computed by supposing the parameter to flow uniformly as it did at the beginning, without any acceleration.

Therefore if the sides of a parallelogram be x and y , their fluxions will be $\dot{x}$ and $\dot{y}$; and the fluxion of the parallelogram $\dot{x}y + y\dot{x}$; and if $x=y$, that is, if the figure be a square, the fluxion of x , will be $2x\dot{x}$.

Fig. 2. Let the triangle ABC be described by the uniform motion of DE from A towards B , the point E moving in the line DE , so as always to touch the lines AC, CB ; while D moves from A to F , DE is uniformly increased, and the increase of the triangle is uniformly accelerated. When DE is in the position EC , it is a maximum. As D moves from F to B , the line DE decreases, and the triangle increases, but with a motion uniformly retarded.

Fig. 3. If the semicircle AFB be generated by the uniform motion of CD from A towards B , while C moves from A to G , the line CD will increase, but with a retarded motion; the circumference also increases with a retarded motion, and the circular space increases with an accelerated motion, but not uniformly, the degrees of acceleration growing less as CD approaches to the position GF . When C moves from G to B , it decreases with a motion continually accelerated, the circumference increases with a motion continually accelerated, and the area increases with a motion continually retarded, and more quickly retarded as CD approaches to B .

The fluxion of a quantity which decreases is to be considered as negative.

When a quantity does not flow uniformly, its fluxion may be represented by a variable quantity, or a line of a variable length; the fluxion of such a line is called the *second fluxion of the quantity whose fluxion that line is*: and if it be variable, a third fluxion may be deduced from it, and higher orders from these in the same

manner: the second fluxion is represented by two points as $\ddot{x}$.

The increment a quantity receives by flowing for any given time, contains measures of all the different orders of fluxions; for if it increases uniformly, the whole increment is the first fluxion; and it has no second fluxions. If it increases with a motion uniformly accelerated, the part of the increment occasioned by the first motion measures the first fluxion, and the parts occasioned by the acceleration measures the second fluxion. If the motion be not only accelerated, but the degree of acceleration continually increased, the two first fluxions are measured as before: and the part of the increment occasioned by the additional degree of acceleration measures the third; and so on. These measures require to be corrected, and are only mentioned here to illustrate the subject.

DIRECT METHOD.

Any flowing quantity being given to find its fluxion.

RULE I. To find the fluxion of any power of a quantity, multiply the fluxion of the root by the exponent of the power, and the product by a power of the same root less by unity than the given exponent.

The fluxion of x^n is $3x^2\dot{x}$, of x^3 , $3x^2\dot{x}$; for the root of x^n is x , whose fluxion is $\dot{x}$; which multiplied by the exponent n , and by a power of x less by unity than n , gives the above fluxion.

If x receive the increment $\dot{x}$, it becomes $x+\dot{x}$; raise both to the power of n , and x^n becomes $x^n + nx^{n-1}\dot{x} + \frac{n(n-1)}{2}x^{n-2}\dot{x}^2 + \dots$; but all the parts of the increment, except the first term, are owing to the accelerated increase of x^n , and form measures of the higher fluxions. The first term only measures the first fluxion. The

fluxion of $\sqrt{x^2+z^2}$ is $\frac{1}{2} \times 2z\dot{z} \times \frac{x}{\sqrt{x^2+z^2}}$; for put $x=a^2+z^2$, we have $\dot{x}=2z\dot{z}$; and the fluxion of $\dot{x}^{\frac{1}{2}}$, which is equal to the proposed fluent, is $\frac{1}{2}\dot{x}^{\frac{1}{2}}$; for which substituting the values of z and x we have the above fluxion.

RULE II. To find the fluxion of the product of several variable quantities multiplied together, multiply the fluxion of each by the product of the rest of the quantities, and the sum of the products thus arising will be the fluxion sought.

Thus the fluxion of xy , is $x\dot{y} + y\dot{x}$; that of xyz , is $xy\dot{z} + xz\dot{y} + yz\dot{x}$; and that of $xyzu$, is $xyz\dot{u} + xyuz\dot{x} + xzuy\dot{y} + yzux\dot{z}$.

RULE III. To find the fluxion of a fraction—From the fluxion of the numerator multiplied by the denominator, subtract the fluxion of the denominator multiplied by the numerator, and divide the remainder by the square of the denominator.

Thus, the fluxion of $\frac{x}{y}$ is $\frac{y\dot{x} - x\dot{y}}{y^2}$; that of $\frac{x}{x+y}$ is $\frac{\dot{x}x + y - x - y\dot{x}}{(x+y)^2} = \frac{yx - xy}{(x+y)^2}$.

RULE

RULE IV. In complex cases, let the particulars be collected from the simple rules, and combined together.

The fluxion of $\frac{x'y'}{z}$ is $\frac{2x'y'y' + 2y'xx'z - x'y'z'}{z^2}$; for

the fluxion of x' is $2xx'$, and of y' is $2yy'$, by Rule I. and therefore the fluxion of $x'y'$ is (by Rule II.) $2x'y'y' + 2y'xx'$; which multiplied by z , (by Rule III.) and subtracting from it the fluxion of the denominator z , multiplied by the numerator, and dividing the whole by the square of the denominator, gives the above fluxion.

RULE V. The second fluxion is derived from the first, in the same manner as the first from the flowing quantity.

Thus the fluxion of x' , $3x'x'$; its second, $6xx'' + 3x'x''$ (by Rule II.); and so on; but if x be invariable, $x'' = 0$, and the second fluxion of $x' = 6xx'$.

PROB. I. To determine maxima and minima.

WHEN a quantity increases, its fluxion is positive; when it decreases, it is negative; therefore when it is just betwixt increasing and decreasing, its fluxion is $= 0$.

RULE. Find the fluxion, make it $= 0$, whence an equation will result that will give an answer to the question.

EXAMP. To determine the dimensions of a cylindric measure ABCD, (fig. 4.) open at the top, which shall contain a given quantity (of liquor, grain, &c.) under the least internal superficies possible.

Let the diameter $AB = x$, and the altitude $BD = y$; moreover, let p . (3,14159, &c.) denote the periphery of the circle whose diameter is unity, and let c be the given content of the cylinder. Then it will be $1 : p :: x : (px)$ the circumference of the base; which, multiplied by the altitude y , gives pxy for the concave superficies of the cylinder. In like manner, the area of the base, by multiplying the same expression into $\frac{1}{4}$

of the diameter x , will be found $= \frac{px^2}{4}$; which drawn

into the altitude y , gives $\frac{px^2y}{4}$ for the solid content of the cylinder; which being made $= c$, the concave sur-

face, pxy will be found $= \frac{4c}{x}$, and consequently the

whole surface $= \frac{4c}{x} + \frac{px^2}{4}$: Whereof the fluxion, which

is $-\frac{4cx}{x^2} + \frac{pxx'}{2}$ being put $= 0$, we shall get $-8cx + px^3 = 0$;

and therefore $x = 2\sqrt{\frac{c}{p}}$: further, because $px^3 = 8c$,

and $px^2y = 4c$, it follows, that $x = 2y$; whence y is also known, and from which it appears that the diameter of the base must be just double of the altitude.

Fig. 7. To find the longest and shortest ordinates of any curve, GEF, whose equation or the relation which the ordinates bear to the abscissas is known.

Make AC the abscissa $= x$, and CE the ordinate $= y$; take a value of y in terms of x , and find its fluxion; which

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making $= 0$, an equation will result whose roots give the value of x when y is a maximum or a minimum.

To determine when it is a maximum and when a minimum, take the value of y , when x is a little more than the root of the equation so found, and it may be perceived whether it increases or decreases.

If the equation has an even number of equal roots, y will be neither a maximum nor minimum when its fluxion is $= 0$.

PROB. II. To draw a tangent to any curve.

Fig. 5. When the abscissa CS of a curve moves uniformly from A to B, the motion of the curve will be retarded if it be concave, and accelerated if convex towards AB; for a straight line TC is described by an uniform motion, and the fluxion of the curve at any point is the same as the fluxion of the tangent, because it would describe the tangent if it continued to move equably from that point. Now if Ss or Ce be the fluxion of the base, Cd will be the fluxion of the tangent, and de of the ordinate. And because the triangles TSC, Ced, are equiangular, $de : Ce :: CS : ST$, wherefore,

RULE. Find a fourth proportional to the fluxion of the ordinate valued in terms of the abscissa, the fluxion of the abscissa, and the ordinate, and it determines the line ST, which is called the *subtangent*, and TC joined is a tangent to the curve.

EXAMP. To draw a right line CT, (fig. 6.) to touch a given circle BCA in a point C.

Let CS be perpendicular to the diameter AB, and put $AB = a$, $BS = x$, and $SC = y$: then, by the property of the circle, $y' (CS') = BS \times AS (= x \times a - x) = ax - x^2$; whereof the fluxion being taken, in order to determine the ratio of x' and y' , we get $2yy' = ax - 2xx'$; consequently $\frac{x'}{y'} = \frac{2y}{a - 2x} = \frac{y}{\frac{1}{2}a - x}$; which multiplied by y , gives $\frac{yx}{\frac{1}{2}a - x} = \frac{y'}{\frac{1}{2}a - x}$ the subtangent ST. Whence (O being supposed the centre) we have OS ($\frac{1}{2}a - x$) : CS (y) :: CS (y) : ST; which we also know from other principles.

PROB. III. To determine points of contrary flexure in curves.

FIG. 7. Supposing C to move uniformly from A to B, the curve GEF will be convex towards AB when the celerity of E increases, and concave when it decreases; therefore, at the point where it ceases to be convex and begins to be concave, or the opposite way, the celerity of E will be uniform, that is, CE will have no second fluxion. Therefore,

RULE. Find the second fluxion of the ordinate in terms of the abscissa, and make it $= 0$; and from the equation that arises you get a value of the abscissa, which determines the point of contrary flexure.

Ex. Let the nature of the curve AGE be defined by the equation $ay = a^{\frac{2}{3}}x^{\frac{1}{3}} + xx$, (the abscissa AF and the ordinate FG being, as usual, represented by x and y respectively). Then y' expressing the celerity of the

point G, in the line FH, will be equal to $\frac{\frac{2}{3}a^{\frac{2}{3}}x^{-\frac{2}{3}} + 2x}{a}$

Whose fluxion, or that of $\frac{2}{3}a^{\frac{2}{3}}x^{-\frac{5}{3}} + 2x$ (because a and R r

and $\dot{x}$ are constant) must be equal to nothing; that is, $-\frac{1}{4}ax^{\frac{1}{2}} - \frac{1}{2}\dot{x} + 2\dot{x} = 0$: Whence $a^{\frac{1}{2}}x - \frac{1}{2} = 8$, $a^{\frac{1}{2}} = 8x^{\frac{1}{2}}$
 $64x^2 = a^2$, and $x = \frac{1}{4}a = AF$; therefore $FG (= \frac{a^{\frac{1}{2}}x^{\frac{1}{2}} + xx}{a})$
 $= \frac{1}{4}a$: From which the position of the point G is given.

PROB. IV. To find the radii of curvature.

THE curvature of a circle is uniform in every point, that of every other curve continually varying: and it is measured at any point by that of a circle whose radius is of such a length as to coincide with it in curvature in that point.

All curves that have the same tangent have the same first fluxion, because the fluxion of a curve and its tangent are the same. If it moved uniformly on from the point of contact, it would describe the tangent. And the deflection from the tangent is owing to the acceleration or retardation of its motion, which is measured by its second fluxion: and consequently two curves which have not only the same tangent, but the same curvature at the point of contact, will have both their first and second fluxions equal. It is easily proved from thence, that the radius of curvature is

$\frac{\dot{z}^2}{-\dot{x}\dot{y}}$; x, y , and z , representing the abscissa, ordinate, and curve respectively.

EXAMP. Let the given curve be the common parabola, whose equation is $y = a^{\frac{1}{2}}x^{\frac{1}{2}}$: Then will $\dot{y} = \frac{1}{4}a^{\frac{1}{2}}x^{-\frac{1}{2}}$
 $= \frac{a^{\frac{1}{2}}}{2x^{\frac{1}{2}}}$, and (making $\dot{x}$ constant) $\ddot{y} = -\frac{1}{4} \times \frac{a^{\frac{1}{2}}}{x^{\frac{3}{2}}} \times x^{-\frac{1}{2}} = -\frac{a^{\frac{1}{2}}}{4x^2}$: Whence $\dot{z} (\sqrt{\dot{x}^2 + \dot{y}^2}) = \frac{\dot{x}}{2} \sqrt{\frac{4x+a}{x}}$, and

the radius of curvature $\left(\frac{z^2}{-\dot{x}\dot{y}} \right) = \frac{a+4x}{2\sqrt{a}}$: Which at the vertex where $x=0$, will be $=\frac{1}{2}a$.

INVERSE METHOD.

From a given fluxion to find a fluent.

THIS is done by tracing back the steps of the direct method. The fluxion of x is $\dot{x}$; and therefore the fluent of $\dot{x}$ is x : but as there is no direct method of finding fluents, this branch of the art is imperfect. We can assign the fluxion of every fluent; but we cannot assign the fluent of a fluxion, unless it be such a one as may be produced by some rule in the direct method from a known fluent.

GENERAL RULE. Divide by the fluxion of the root, add unity to the exponent of the power, and divide by the exponent so increased.

For dividing the fluxion $nx^{n-1}\dot{x}$ by x (the fluxion of the root x) it becomes nx^{n-1} ; and, adding 1 to the exponent ($n-1$), we have nx^n ; which divided by n , gives x^n , the true fluent of $nx^{n-1}\dot{x}$.

Hence (by the same rule) the

Fluent of $3x^2\dot{x}$ will be $=x^3$;

That of $8x^{\frac{1}{2}}\dot{x} = \frac{8x^{\frac{3}{2}}}{\frac{3}{2}}$;

That of $2x^{\frac{1}{2}}\dot{x} = \frac{x^{\frac{3}{2}}}{\frac{3}{2}}$.

That of $y^{\frac{1}{2}}\dot{y} = \frac{2}{3}y^{\frac{3}{2}}$.

Sometimes the fluent so found requires to be corrected. The fluxion of x is $\dot{x}$, and the fluxion of $a+x$ is also $\dot{x}$; because a is invariable, and has therefore no fluxion.

Now when the fluent of $\dot{x}$ is required, it must be determined, from the nature of the problem, whether any invariable part, as a , must be added to the variable part x .

When fluents cannot be exactly found, they can be approximated by infinite series.

Ex. Let it be required to approximate the fluent of

$\frac{a^2 - x^2}{c^2 - x^2} \times x^{\frac{1}{2}}\dot{x}$ in an infinite series.

The value of $\frac{a^2 - x^2}{c^2 - x^2}$, expressed in a series, is $\frac{a^2}{c^2} +$

$\frac{a}{2c^2} - \frac{1}{2ac} \times x^2 + \frac{3a}{8c^2} - \frac{1}{4ac^2} - \frac{1}{8a^2c} \times x^4 + \frac{5a}{16c} - \frac{3}{16ac} \times x^6 + \frac{1}{16a^2c^2} - \frac{1}{16a^2c} \times x^8 + \&c.$ Which value being therefore multiplied by $x^{\frac{1}{2}}\dot{x}$, and the fluent taken (by the common method) we get $\frac{ax^{n+1}}{n+1 \times c} + \frac{a}{2c^2} - \frac{1}{2ac} \times \frac{x^{n+3}}{n+3} +$

$\frac{3a}{8c^2} - \frac{1}{4ac^2} - \frac{1}{8a^2c} \times \frac{x^{n+5}}{n+5} + \frac{5a}{16c^2} - \frac{3}{16ac^2} - \frac{1}{16a^2c^2} - \frac{1}{16a^2c} \times \frac{x^{n+7}}{n+7} + \&c.$

PROB. I. To find the area of any curve.

RULE. Multiply the ordinate by the fluxion of the abscissa, and the product gives the fluxion of the figure, whose fluent is the area of the figure.

EXAMP. I. Fig. 8. Let the curve ARMH, whose area you would find, be the common parabola. Let u represent the area, and $\dot{u}$ its fluxion.

In which case the relation of AB (x) and BR (y) being expressed by $y = ax$ (where a is the parameter) we thence get $y = a^{\frac{1}{2}}x^{\frac{1}{2}}$; and therefore $\dot{u} = RmHB (=y\dot{x}) = a^{\frac{1}{2}}x^{\frac{1}{2}}\dot{x}$: whence $u = \frac{2}{3} \times a^{\frac{1}{2}}x^{\frac{3}{2}} = \frac{2}{3}a^{\frac{1}{2}}x^{\frac{3}{2}} \times x = \frac{2}{3}yx$ (because $a^{\frac{1}{2}}x^{\frac{1}{2}} = y$) $= \frac{2}{3} \times AB \times BR$: hence a parabola is $\frac{2}{3}$ of a rectangle of the same base and altitude.

EXAMP. 2. Let the proposed curve CSDR (fig. 9.) be of such a nature, that (supposing AB unity) the sum of the areas CSTBC and CDGBC answering to any two proposed abscissas AT and AG, shall be equal to the area CRNBC, whose corresponding abscissa AN is equal

equal to $AT \times AG$, the product of the measures of the two former abscissas.

First, in order to determine the equation of the curve (which must be known before the area can be found), let the ordinates GD and NR move parallel to themselves towards HF ; and then having put $GD=y$, $NR=z$, $AT=a$, $AG=s$, and $AN=u$, the fluxion of the area $CDGB$ will be represented by ys , and that of the area $CRNB$ by zu : which two expressions must, by the nature of the problem, be equal to each other; because the latter area $CRNB$ exceeds the former $CDGB$ by the area $CSTB$, which is here considered as a constant quantity: and it is evident, that two expressions, that differ only by a constant quantity, must always have equal fluxions.

Since, therefore, ys is $= zu$, and $u=as$, by hypothesis, it follows, that $\dot{u}=a\dot{s}$, and that the first equation (by substituting for $\dot{u}$) will become $ys=a\dot{z}s$, or $y=a\dot{z}$, or lastly $ys=zas$, that is, $GD \times AG = NR \times AN$: therefore, $GD : NR :: AN : AG$; whence it appears, that every ordinate of the curve is reciprocally as its corresponding abscissa.

Now, to find the area of the curve so determined, put $AB=1$, $BC=b$, and $BG=x$: then, since $AG(1+x) : AB(1) :: BC(b) : GD(y)$ we have $y = \frac{bx}{1+x}$,

consequently $\dot{u} (=y\dot{x}) = \frac{b\dot{x}}{1+x} = b \times \dot{x} - x\dot{x} + x^2\dot{x} - x^3\dot{x} + x^4\dot{x} - \&c.$ Whence $BGDC$, the area itself will be $= b \times x - \frac{x^2}{2} + \frac{x^3}{3} - \frac{x^4}{4} + \frac{x^5}{5} - \&c.$ which was to be found.

Hence it appears, that as these areas have the same properties as logarithms, this series gives an easy method of computing logarithms; and the fluent may be found by means of a table of logarithms, without the trouble of an infinite series: and every fluxion whose fluent agrees with any known logarithmic expression, may be found the same way. Hence the fluents of fluxions of the following forms are deduced.

The fluent of $\frac{\dot{x}}{\sqrt{x^2 \pm a^2}} = \text{hyp. log. of } x + \sqrt{x^2 \pm a^2}$;

of $\frac{\dot{x}}{\sqrt{2ax \pm xx}} = \text{hyp. log. of } a \times x + \sqrt{2ax \pm xx}$;

of $\frac{2a\dot{x}}{a^2 - x^2} = \text{hyp. log. of } \frac{a+x}{a-x}$

and of $\frac{2a\dot{x}}{x\sqrt{a^2 \pm x^2}} = \text{hyp. log. of } \frac{a - \sqrt{a^2 \pm x^2}}{a + \sqrt{a^2 \pm x^2}}$

PROB. 2. To determine the length of curves.

Fig. 5. Because Cde is a right-angled triangle, $Cd^2 = Ce^2 + de^2$; wherefore the fluxions of the abscissa and ordinate being taken in the same terms and squared, their sum gives the square of the fluxion of the curve; whose root being extracted, and the fluent taken, gives the length of the curve.

EXAMP. To find the length of a circle from its tangent. Make the radius AO (fig. 5.) $=a$, the tangent of $AC=t$, and its secant $=s$, the curve $=z$, and its

fluxion $=\dot{z}$; because the triangles OTC , OCS , are similar, $OT : OC :: OC : OS$; whence $OS = \frac{a^2}{s}$, and $SA = a - \frac{a^2}{s} = a - \frac{a^2}{\sqrt{a^2 + t^2}}$; whose

fluxion is $\frac{a^2 \dot{t}}{a^2 + t^2}$; and because the triangles OTC , dCe are similar, $TC (=t) : TO (= \sqrt{a^2 + t^2}) :: Cc = \left(\frac{a^2 \dot{t}}{a^2 + t^2} \right) : Cd = \frac{a^2 \dot{t}}{a^2 + t^2} = \text{fluxion of the curve.}$

Now by converting this into an infinite series we have the fluxion of the curve $= \dot{t} - \frac{t^2 \dot{t}}{a^2} + \frac{t^4 \dot{t}}{a^4} - \frac{t^6 \dot{t}}{a^6} + \&c.$ and con-

sequently $z = t - \frac{t^3}{3a^2} + \frac{t^5}{5a^4} - \frac{t^7}{7a^6} + \frac{t^9}{9a^8} - \&c. = AC.$

Where, if (for example's sake) AC be supposed an arch of 30 degrees, and AO (to render the operation more easy) be put $=$ unity, we shall have $t = \sqrt{\frac{1}{3}} = .5773502$ (because $OS(\sqrt{\frac{1}{3}}) : SC(\frac{1}{3}) :: OA(1) : CT(t) = \sqrt{\frac{1}{3}}$) Whence,

$$\begin{aligned} t^3 &= (.5773502 \times .5773502 \times .5773502) = .1924500 \\ t^5 &= (.5773502 \times .5773502 \times .5773502 \times .5773502 \times .5773502) = .0641500 \\ t^7 &= (.5773502 \times .5773502 \times .5773502 \times .5773502 \times .5773502 \times .5773502 \times .5773502) = .0213833 \\ t^9 &= (.5773502 \times .5773502 \times .5773502 \times .5773502 \times .5773502 \times .5773502 \times .5773502 \times .5773502 \times .5773502) = .0071277 \\ t^{11} &= (.5773502 \times .5773502 \times .5773502 \times .5773502 \times .5773502 \times .5773502 \times .5773502 \times .5773502 \times .5773502 \times .5773502 \times .5773502) = .0023759 \\ t^{13} &= (.5773502 \times .5773502 \times .5773502 \times .5773502 \times .5773502 \times .5773502 \times .5773502 \times .5773502 \times .5773502 \times .5773502 \times .5773502 \times .5773502) = .0007919 \\ t^{15} &= (.5773502 \times .5773502 \times .5773502 \times .5773502 \times .5773502 \times .5773502 \times .5773502 \times .5773502 \times .5773502 \times .5773502 \times .5773502 \times .5773502 \times .5773502) = .0002639 \\ &\&c. \end{aligned}$$

And therefore $AC = .5773502 - \frac{.1924500}{3} + \frac{.0641500}{5} - \frac{.0213833}{7} + \frac{.0071277}{9} - \frac{.0023759}{11} + \frac{.0007919}{13} - \frac{.0002639}{15} + \frac{.0000879}{17} - \frac{.0000293}{19} + \frac{.0000097}{21} - \frac{.0000032}{23} + = .5235987$: for the length of an arch of 30 degrees, which multiplied by 6 gives $3.141592 +$ for the length of the semi-periphery of the circle whose radius is unity.

Other series may be deduced from the versed sine and secant; and these are of use for finding fluents which cannot be expressed in finite terms.

the fluent of	$\frac{\dot{w}}{\sqrt{2aw - w^2}}$	is equal to the arch whose	Versed sine	is $\frac{w}{a}$, and Radius Unity.
	$\frac{\dot{w}}{\sqrt{a^2 - w^2}}$		Right sine	
	$\frac{a\dot{w}}{a^2 + w^2}$		Tangent	
	$\frac{a\dot{w}}{w\sqrt{w^2 - a^2}}$		Secant	

R 2

PROB. III. To find the contents of a solid.

LET the surface of the generating plane be multiplied by the space it passes through in any time, the product will give a solid which is the fluxion of the solid required: the surface must therefore be computed in terms of x , which represents the line or axis on which it moves, and by its motion on which the fluxion is to be measured, and the fluent found will give the contents of the solid.

EXAMP. Let it be proposed to find the content of a cone ABC, fig. 10.

Put the given altitude (AD) of the cone $=a$, and the semidiameter (BD) of its base $=b$, the solid $=s$, its fluxion $=\dot{s}$, and the area of a circle whose radius is unity, $=p$: then the distance (AF) of the circle EG, from the vertex A, being denoted by x , we have, by similar triangles, as $a : b :: x : EF (y) = \frac{bx}{a}$. Whence in this case, $\dot{s} (=p y \dot{x}) = \frac{pb \dot{x} x}{a}$;

and consequently $s = \frac{pb^2 x^2}{3a}$; which, when $x=a (=AD)$

gives $\frac{pb^2 a}{3} (=p \times BD^2 \times \frac{1}{3} AD)$ for the content of the

whole cone ABC: which appears from hence to be just $\frac{1}{3}$ of a cylinder of the same base and altitude.

PROB. IV. To compute the surface of any solid body.

THE fluxion of the surface of the solid is equal to the periphery of the surface, by whose motion the fo-

lid is generated, multiplied by its velocity on the edge of the solid, and the computation is made as in the foregoing.

EXAMP. Let it be proposed to determine the convex superficies of a cone ABC, fig. 11.

Then, the semidiameter of the base (BD or CD) being put $=b$, the slanting line or hypotenuse $AC=c$, and FH (parallel to DC) $=y$, AH $=z$, the surface $=w$, its fluxion $=\dot{w}$, and p the periphery of a circle whose diameter is unity, we shall, from the similarity of the triangles ADC and Hmh, have $b : c :: y : (mh) : z (Hh) = \frac{cy}{b}$: whence $\dot{w} (2py\dot{z}) = \frac{2pcy\dot{y}}{b}$; and

consequently $w = \frac{pcy^2}{b}$. This, when $y=b$, becomes $=pcb = p \times DC \times AC =$ the convex superficies of the whole cone ABC: which therefore is equal to a rectangle under half the circumference of the base and slanting line.

The method of fluxions is also applied to find the centres of gravities, and oscillation of different bodies; to determine the paths described by projectiles and bodies acted on by central forces, with the laws of centripetal force in different curves, the retardates given to motions performed in resisting media, the attractions of bodies under different forms, the direction of wind which has the greatest effect on an engine, and to solve many other curious and useful problems.

F L Y

Fly.

FLY, in zoology, a larger order of insects, the distinguishing characteristic of which is, that their wings are transparent. By this they are distinguished from beetles, butterflies, grasshoppers, &c.

Flies are subdivided into those which have four, and those which have two wings.

Of those with four wings there are several genera or kinds; as the ant, apis, ichneumon, &c. See APIS, FORMICA, &c.

Of those with two wings, there are likewise several kinds, as the gad-fly, gnat, &c. See GAD-FLY, &c.

Those who desire a more particular account of the anatomy, generation, structure, and manifold subdivisions of flies, may consult Reaumer's History of Insects, tom. 4. See also ENTOMOLOGY.

Horse-FLY. See MUSCA.

Pestilential-FLY. See ETHIOPIA, n° II.

FLY, in mechanics, a cross with leaden weights at its ends; or rather, a heavy wheel at right angles, to the axis of a windlass, jack, or the like; by means of which, the force of the power, whatever it is, is not only preserved, but equally distributed in all parts of the revolution of the machine. See MECHANICS.

FLIES for Fishing. See FISHING-FLY.

Vegetable FLX, a very curious natural production chiefly found in the West Indies. "Excepting that it has no wings, it resembles the drone both in size and colour more than any other British insect. In the month of May it buries itself in the earth, and begins to vegetate. By the latter end of July, the tree

F L Y

Fly.

is arrived at its full growth, and resembles a coral branch; and is about three inches high, and bears several little pods, which dropping off become worms, and from thence flies, like the British caterpillar."

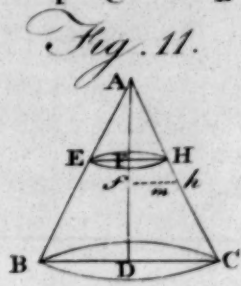
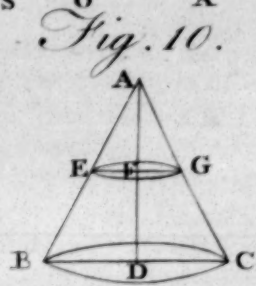
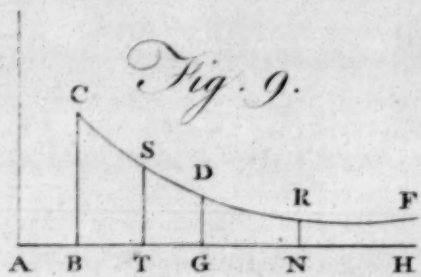
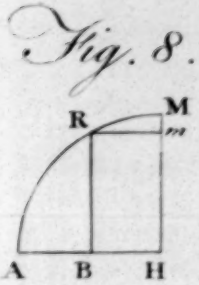
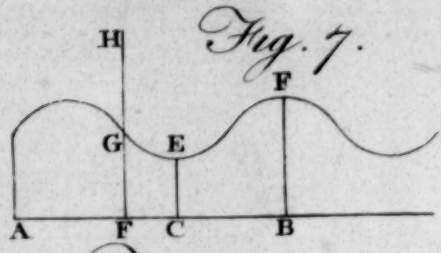
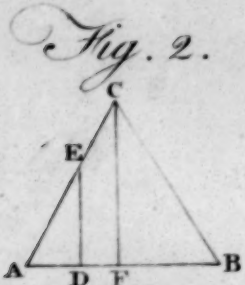
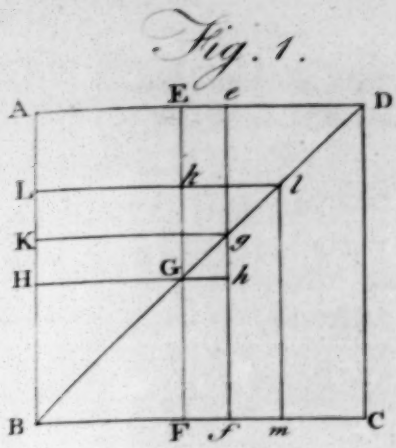
Such was the account originally given of this extraordinary production. But several boxes of these for 1763. flies having been sent to Dr Hill for examination, his report was this: "There is in Martinique a fungus of the clavaria kind, different in species from those hitherto known. It produces soboles from its sides; I call it therefore *clavaria sobolifera*. It grows on putrid animal bodies, as our *fungus ex pede equino* from the dead horse's hoof. The cicada is common in Martinique, and in its nymph state, in which the old authors call it *tettigometra*: it buries itself under dead leaves to wait its change; and when the season is unfavourable, many perish. The seeds of the clavaria find a proper bed on this dead insect, and grow. The *tettigometra* is among the cicadae in the British museum: the clavaria is just now known. This is the fact, and all the fact; though the untaught inhabitants suppose a fly to vegetate, and though there is a Spanish drawing of the plants growing into a trifoliate tree, and it has been figured with the creature flying with this tree upon its back."

The ingenious Mr Edwards has taken notice of this extraordinary production in his Gleanings of Natural History, from which the figures on Plate CXCVI. are taken,

FLY-Boat, or Flight, a large flat-bottomed Dutch vessel,

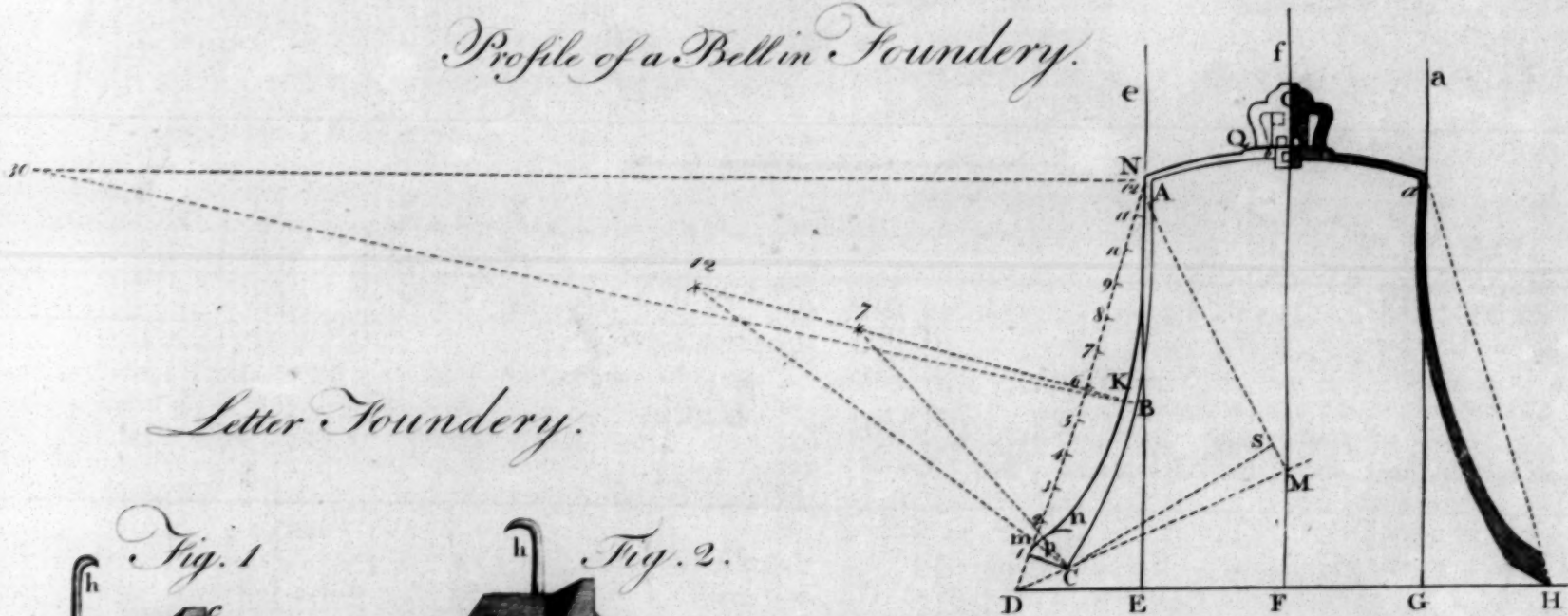
FLUXIONS..

Plate CXCV.

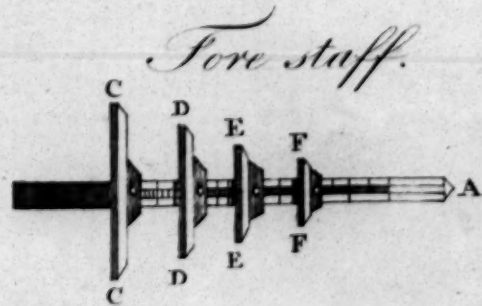
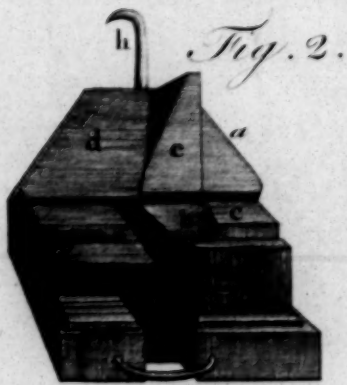
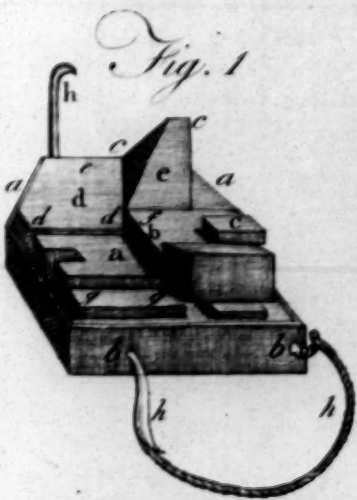


FOUNDERY.

Profile of a Bell in Foundry.



Letter Foundry.





Fly,
Flyers.

vessel, whose burden is generally from 600 to 1200 tons. It is distinguished by a stern remarkably high, resembling a Gothic turret, and by very broad buttocks below.

FLY-Catcher, in zoology. See *MUSCICAPA*.

FLY-Trap, in botany, a newly discovered sensitive plant. See *DIONÆA Muscipula*.

FLY-Tree, in natural history, a name given by some people of America to a tree, whose leaves, they say, at a certain time of the year produce flies. On examining these leaves about the middle of summer, the time at which the flies used to be produced, there are found on them a sort of bag of a tough matter, of about the size of a filbert, and of a dusky greenish colour. On opening one of these bags with a knife, there is usually found a single full-grown fly, of the gnat kind, and a number of small worms, which in a day or two more have wings, and flee away in the form of their parent. The tree is of the mulberry kind, and its leaves are usually very largely stocked with these insect-bags; and the generality of them are found to contain the insects in their worm-state; when they become winged, they soon make their way out. The bags begin to appear when the leaves are young, and afterwards grow with them; but they never rumple the leaf or injure its shape. They are of the kind of leaf-galls, and partake in all respects, except size, of a species we have frequent on the large maple, or, as it is called, the *Jycamore*.

FLYERS, in architecture, such stairs as go straight, and do not wind round, nor have the steps made tapering; but the fore and back part of each stair and the ends respectively parallel to one another: So that if one flight do not carry you to your designed height, there is a broad half space; and then you fly again, with steps every where of the same breadth and length as before.

FLYERS, the performers in a celebrated exhibition among the Mexicans, which was made on certain great festivals, and is thus described by Clavigero in his History of that people. "They fought in the woods for an extremely lofty tree, which after stripping it of its branches and bark, they brought to the city, and fixed in the centre of some large square. They cased the point of the tree in a wooden cylinder, which, on account of some resemblance in its shape, the Spaniards called a *mortar*. From this cylinder hung four strong ropes, which served to support a square frame. In the space between the cylinder and the frame, they fixed four other thick ropes, which they twisted as many times round the tree as there were revolutions to be made by the flyers. These ropes were drawn through four holes, made in the middle of the four planks of which the frame consisted. The four principal flyers disguised like eagles, herons, and other birds, mounted the tree with great agility, by means of a rope which was laced about it from the ground up to the frame; from the frame they mounted one at a time successively upon the cylinder, and after having danced there a little, they tied themselves round with the ends of the ropes, which were drawn through the holes of the frame, and launching with a spring from it, began their flight with their wings expanded. The action of their bodies put the frame and the cylinder in motion; the frame

by its revolutions gradually untwisted the cords by which the flyers swung; so that as the ropes lengthened, they made so much the greater circles in their flight. Whilst these four were flying, a fifth danced upon the cylinder, beating a little drum, or waving a flag, without the smallest apprehension of the danger he was in of being precipitated from such a height. The others who were upon the frame (there having been 10 or 12 persons generally who mounted), as soon as they saw the flyers in their last revolution, precipitated themselves by the same ropes, in order to reach the ground at the same time amidst the acclamations of the populace. Those who precipitated themselves in this manner by the ropes, that they might make a still greater display of their agility, frequently passed from one rope to another, at that part where, on account of the little distance between them, it was possible for them to do so. The most essential point of this performance consisted in proportioning so justly the height of the tree with the length of the ropes, that the flyers should reach the ground with 13 revolutions, to represent by such number their century of 52 years, composed in the manner we have already mentioned. This celebrated diversion is still in use in that kingdom; but no particular attention is paid to the number of the revolutions or the flyers; as the frame is commonly hexagonal or octagonal, and the flyers 6 or 8 in number. In some places they put a rail round the frame, to prevent accidents which were frequent after the conquest; as the Indians became much given to drinking, and used to mount the tree when intoxicated with wine or brandy, and were unable to keep their station on so great a height, which was usually 60 feet." See Plate CXCVI.

FLYING, the progressive motion of a bird, or other winged animal, in the air.

The parts of birds chiefly concerned in flying are the wings and tail: by the first, the bird sustains and wafts himself along: and by the second, he is assisted in ascending and descending, to keep his body poised and upright, and to obviate the vacillations thereof.

It is by the largeness and strength of the pectoral muscles, that birds are so well disposed for quick, strong, and continued flying. These muscles, which in men are scarce a 70th part of the muscles of the body in birds, exceed and outweigh all the other muscles taken together; upon which Mr Willoughby makes this reflection, that if it be possible for man to fly, his wings must be so contrived and adapted, that he may make use of his legs, and not his arms, in managing them.

The tail, Messrs Willoughby, Ray, and many others, imagine to be principally employed in steering and turning the body in the air, as a rudder; but Borelli has put it beyond all doubt, that this is the least use of it, which is chiefly to assist the bird in its ascent and descent in the air, and to obviate the vacillations of the body and wings: for, as to turning to this or that side, it is performed by the wings and inclination of the body, and but very little by the help of the tail. The flying of a bird, in effect, is quite a different thing from the rowing of a vessel. Birds do not vibrate their wings towards the tail, as oars are struck towards the stern,

Flying.

Flying. stern, but waft them downwards; nor does the tail of the bird cut the air at right angles, as the rudder does the water; but is disposed horizontally, and preserves the same situation what way soever the bird turns. In effect, as a vessel is turned about on its centre of gravity to the right, by a brisk application of the oars to the left; so a bird, in beating the air with its right wing alone, towards the tail, will turn its fore-part to the left. Thus pigeons changing their course to the left, would labour it with their right wing, keeping the other almost at rest. Birds of a long neck alter their course by the inclination of their head and neck; which altering the course of gravity, the bird will proceed in a new direction.

The manner of FLYING is thus: The bird first bends his legs, and springs with a violent leap from the ground; then opens and expands the joints of his wings, so as to make a right line perpendicular to the sides of his body: thus the wings, with all the feathers therein, constitute one continued lamina. Being now raised a little above the horizon, and vibrating the wings with great force and velocity perpendicularly against the subject air, that fluid resists those succussions, both from its natural inactivity and elasticity, by means of which the whole body of the bird is protruded. The resistance the air makes to the withdrawing of the wings, and consequently the progress of the bird, will be so much the greater, as the waft or stroke of the fan of the wing is longer: but as the force of the wing is continually diminished by this resistance, when the two forces continue to be in *equilibrium*, the bird will remain suspended in the same place; for the bird only ascends so long as the arch of air the wing describes makes a resistance equal to the excess of the specific gravity of the bird above the air. If the air, therefore be so rare as to give way with the same velocity as it is struck withal, there will be no resistance, and consequently the bird can never mount. Birds never fly upwards in a perpendicular line, but always in a parabola. In a direct ascent, the natural and artificial tendency would oppose and destroy each other, so that the progress would be very slow. In a direct descent they would aid one another, so that the fall would be too precipitate.

Artificial FLYING, that attempted by men, by the assistance of mechanics.

The art of flying has been attempted by several persons in all ages. The Leucadians, out of superstition, are reported to have had a custom of precipitating a man from a high cliff into the sea, first fixing feathers, variously expanded, round his body, in order to break the fall.

Friar Bacon, who lived near 500 years ago, not only affirms the art of flying possible, but assures us, that he himself knew how to make an engine wherein a man sitting might be able to convey himself through the air like a bird; and further adds, that there was then one who had tried it with success. The secret consisted in a couple of large thin hollow copper-globes, exhausted of air; which being much lighter than air, would sustain a chair whereon a person might sit. Fa. Francisco Lana, in his *Prodromo*, proposes the same thing, as his own thought. He computes, that a round vessel of plate-brass, 14 feet in diameter, weighing

three ounces the square foot, will only weigh 1848 ounces; whereas a quantity of air of the same bulk will weigh 2155½ ounces; so that the globe will not only be sustained in the air, but will carry with it a weight of 373½ ounces, and by increasing the bulk of the globe, without increasing the thickness of the metal, he adds, that a vessel might be made to carry a much greater weight.—But the fallacy is obvious: a globe of the dimensions he describes, Dr Hook shows, would not sustain the pressure of the air, but be crushed inwards. Besides, in whatever ratio the bulk of the globe were increased, in the same must be the thickness of the metal, and consequently the weight be increased: so that there would be no advantage in such augmentation. See AEROSTATION.

The same author describes an engine for flying, invented by the Sieur Besnier, a smith of Sable, in the county of Main. *Vid. Philosoph. Collect. N° 1.*

The philosophers of king Charles the Second's reign were mightily busied about this art. The famous bishop Wilkins was so confident of success in it, that he says, he does not question but in future ages it will be as usual to hear a man call for his wings, when he is going a journey, as it is now to call for his boots.

FLYING-Bridge. See BRIDGE.

FLYING-Fish, a name given by the English writers to several species of fish, which by means of their long fins, have a method of keeping themselves out of water a considerable time. See EXOCOETUS.

FLYING-Pinion, is a part of a clock, having a fly or fan whereby to gather air, and so bridle the rapidity of the clock's motion, when the weight descends in the striking part.

FO, or FOE; an idol of the Chinese. He was originally worshipped in the Indies, and transported from thence into China, together with the fables with which the Indian books were filled. He is said to have performed most wonderful things, which the Chinese have described in several volumes, and represented by cuts.

Sett of Fo. See CHINA, n° 103.

Fo Kien. See FOKIEN.

FOAL, or COLT and FILLY; the young of the horse kind. The word *colt*, among dealers, is understood of the male, as *filly* is of the female. See COLT.

FOCUS, in geometry and conic sections, is applied to certain points in the parabola, ellipsis, and hyperbola, where the rays reflected from all parts of these curves concur and meet. See CONIC SECTIONS.

Focus, in optics; a point in which any number of rays, after being reflected or refracted, meet.

FODDER, any kind of meat for horses or other cattle. In some places hay and straw, mingled together, is peculiarly denominated *fodder*.

FODDER, in the civil law, is used for a prerogative that the prince has, to be provided of corn and other meats for his horses, by the subjects, in his warlike expeditions.

FODDER, in mining, a measure containing 22 hundred and an half weight, though in London but 20 hundred weight.

FOENUGREEK, in botany. See TRIGONELLA.

FOENUS NAUTICUM. Where money is lent to a merchant, to be employed in a beneficial trade with condition to be repaid, with extraordinary interest, in case

Flying
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Foenus.

Fœtus
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Fog.

case such voyage was safely performed, the agreement was sometimes called *fœnus nauticum*, sometimes *usura maritima*. But as this gave an opening for usurious and gaming contracts, 19 Geo. II. c. 37. enacts, that all money lent on bottomry, or at *respondentia*, on vessels bound to or from the East-Indies, shall be expressly lent only upon the ship or merchandise: the lender to have the benefit of salvage, &c. *Blackst. Com. II. 459. Mol. de Jur. Mar. 361.*

FOESIUS (Anulius), a very learned and celebrated physician of the faculty of Paris, born at Mentz in 1528. He translated into Latin the whole works of Hippocrates, judiciously correcting the Greek text as he went along; and composed a kind of dictionary to him, intitled, *Oeconomia Hippocratis*. He translated, beside, the Commentaries of Galen upon the second book of Hippocrates; and was the author of some other works. After practising physic a long time with great success and reputation, at Lorrain and other places, he died in 1596.

FOETOR, in medicine, stinking or fetid effluvia arising from the body or any part thereof.

FOETUS, the young of all viviparous animals whilst in the womb, and of oviparous animals before being hatched: the name is transferred by botanists to the *embryos of vegetables*.

Strictly, the name is applied to the young after it is perfectly formed: till which time it is more properly called EMBRYO. See ANATOMY, n° 109, 110.

In the human fœtus are several peculiarities not to be found in the adult; some of them are as follows. 1. The arteries of the navel-string, which are continuations of the hypogastrics, are, after the birth, shrivelled up, and form the ligamenta umbilic. infer. 2. The veins of the navel-string are formed by the union of all the venous branches in the placenta, and passing into the abdomen become the falciform ligament of the liver. 3. The lungs, before being inflated with air, are compact and heavy, but after one inspiration they become light, and as it were spongy: and it may be noted here, that the notion of the lungs sinking in water before the child breathes, and of their swimming after the reception of air, are no certain proofs that the child had or had not breathed, much less that it was murdered: for the uninflated lungs become specifically lighter than water as soon as any degree of putrefaction takes place in them; and this soon happens after the death of the child; besides, where the utmost care hath been taken to preserve the child it hath breathed once or twice, and then died. 4. The thymus gland is very large in the fœtus, but dwindles away in proportion as years advance. 5. The foramen ovale in the heart of a fœtus, is generally closed in an adult.

FOG, or MIST, a meteor, consisting of gross vapours, floating near the surface of the earth.

Mists, according to lord Bacon, are imperfect condensations of the air consisting of a large proportion of the air, and a small one of the aqueous vapour: and these happen in the winter, about the change of the weather from frost to thaw, or from thaw to frost; but in the summer, and in the spring, from the expansion of the dew.

If the vapours, which are raised plentifully from the earth and waters, either by the solar or subterraneous

heat, do at their first entrance into the atmosphere meet with cold enough to condense them to a considerable degree, their specific gravity is by that means increased, and so they will be stopped from ascending; and either return back in form of dew or of drizzling rain, or remain suspended for some time in form of a fog. Vapours may be seen on the high grounds as well as the low, but more especially about marshy places. They are easily dissipated by the wind, as also by the heat of the sun. They continue longest in the lowest grounds, because these places contain most moisture, and are least exposed to the action of the wind.

Hence we may easily conceive, that fogs are only low clouds, or clouds in the lowest region of the air; as clouds are no other than fogs raised on high. See CLOUD.

When fogs stink, then the vapours are mixed with sulphureous exhalations, which smell so. Objects viewed through fogs appear larger and more remote than through the common air. Mr Boyle observes, that upon the coast of Coromandel, and most maritime parts of the East-Indies, there are, notwithstanding the heat of the climate, annual fogs so thick, as to occasion people of other nations who reside there, and even the more tender sort of the natives, to keep their houses close shut up.

Fogs are commonly pretty strongly electrified, as appears from Mr Cavallo's observations upon them. See ELECTRICITY, n° 76.

FOGAGE, in the forest law, is rank grass not eaten up in summer.

FOGLIETA, (Oberto or Hubert), a Genoese priest, and one of the most learned writers of the 16th century. He had a share in the disturbances that were raised at Genoa, for which he was banished; and died at Rome in 1581, aged 63. He wrote a history of Genoa in Italian, which is highly esteemed; and many works in Latin.

FOGO, or FUEGO. See FUEGO.

FOHI. See FE; and CHINA, n° 7.

FOIBLE, a French term, frequently used also in our language. It literally signifies *weak*; and in that sense is applied to the body of animals and the parts thereof, as *foible reins*, *foible sight*, &c. being derived from the Italian *fièvre*, of the Latin *febilis*, to be "lamented, pitied."

But it is chiefly used with us substantively, to denote a defect or flaw in any person or thing. Thus we say, every person has his foible; and the great secret consists in hiding it artfully: Princes are gained by flattery, that is their foible: The foible of young people is pleasure; the foible of old men is avarice; the foible of the great and learned is vanity; the foible of women and girls, coquetry, or an affectation of having gallants: You should know the forty and the foible of a man before you employ him: We should not let people perceive that we know their foible.

FOIL, in fencing, denotes a blunt sword, or one that has a button at the end covered with leather, used in learning the art of fencing.

FOIL, among glass-grinders, a sheet of tin, with quicksilver, or the like, laid on the backside of a looking-glass, to make it reflect. See FOLIATING.

FOIL, among jewellers, a thin leaf of metal placed under

Fogage
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Foil.

Foil
Folard.

under a precious stone, in order to make it look transparent, and give it an agreeable different colour, either deep or pale: thus, if you want a stone to be of a pale colour, put a foil of that colour under it; or if you would have it deep, lay a dark one under it.

These foils are made either of copper, gold, or gold and silver together. The copper foils are commonly known by the name of *Nuremberg* or *German foils*; and are prepared as follows: Procure the thinnest copper-plates you can get: beat these plates gently upon a well-polished anvil, with a polished hammer, as thin as possible; and placing them between two iron-plates as thin as writing-paper, heat them in the fire; then boil the foil in a pipkin, with equal quantities of tartar, and salt, constantly stirring them till by boiling they become white; after which, taking them out and drying them, give them another hammering, till they are made fit for your purpose: however care must be taken not to give the foils too much heat, for fear of melting; nor must they be too long boiled, for fear of attracting too much salt.

The manner of polishing these foils is as follows: Take a plate of the best copper, one foot long and about five or six inches wide, polished to the greatest perfection; bend this to a long convex, fasten it upon a half roll, and fix it to a bench or table; then take some chalk, washed as clean as possible, and filtered through a fine linen cloth, till it be as fine as you can make it; and having laid some thereof on the roll, and wetted the copper all over, lay your foils on it, and with a polishing stone and the chalk polish your foils till they are as bright as a looking-glass; after which they must be dried, and laid up secure from dust.

FOKIEN, a province of China in Asia, commodiously situated for navigation and commerce, part of it bordering on the sea, in which they catch large quantities of fish, which they send salted to other parts of the empire. Its shores are very uneven, by reason of the number and variety of its bays; and there are many forts built thereon to guard the coast. The air is hot, but pure and wholesome.

The mountains are almost every where disposed into a kind of amphitheatres, by the labour of the inhabitants, with terraces placed one above another. The fields are watered with rivers and springs, which issue out of the mountains, and which the husbandmen conduct in such a manner as to overflow the fields of rice when they please, because it thrives best in watery ground. They make use of pipes of bambo for this purpose.

They have all commodities in common with the rest of China; but more particularly musk, precious stones, quicksilver, silk, hempen cloth, calico, iron, and all sorts of utensils, wrought to the greatest perfection. From other countries they have cloves, cinnamon, pepper, sandal-wood, amber, coral, and many other things. The capital city is Foutcheou Fou; or, as others would have it written, Fucherosu. But as for Fokien, which most geographers make the capital, Grosier informs us there is no such place.

FOLARD (Charles), an eminent Frenchman, famous for his skill and knowledge in the art military, was born at Avignon in 1669, of a noble family, but not a rich one. He discovered an early turn for the

sciences, and a strong passion for arms; which last was so inflamed by reading Cæsar's Commentaries, that he enlisted at 16 years of age. His father got him off, and shut him in a monastery: but he made his escape in about two years after, and entered himself a second time in quality of cadet. His inclination for military affairs, and the great pains he took to accomplish himself in that way, recommended him to notice; and he was admitted into the friendship of the first-rate officers. M. de Vendome, who commanded in Italy in 1720, made him his aid-de-camp, having conceived the highest regard for him; and soon after sent him with part of his forces into Lombardy. He was entirely trusted by the commander of that army; and no measures were concerted, or steps taken, without consulting him. By pursuing his plans, many places were taken, and advantages gained; and such, in short, were his services, that he had a pension of 400 livres settled upon him, and was honoured with the cross of St Lewis. He distinguished himself greatly August 15, 1705, at the battle of Cassano; where he received a wound upon his left hand, which deprived him of the use of it ever after. It was at this battle that he conceived the first idea of that system of columns, which he afterwards prefixed to his Commentaries upon Polybius. The duke of Orleans sending de Vendome again into Italy in 1706, Folard had orders to throw himself into Modena to defend it against Eugene: where, tho' he acquitted himself with his usual skill, he was very near being assassinated. The description which he has given of the conduct and character of the governor of this town, may be found in his Treatise of the Defence of Places, and deserves to be read. He received a dangerous wound on the thigh at the battle of Malplaquet, and was some time after made prisoner by prince Eugene. Being exchanged in 1711, he was made governor of Bourbourg. In 1714 he went to Malta, to assist in defending that island against the Turks. Upon his return to France, he embarked for Sweden, having a passionate desire to see Charles XII. He acquired the esteem and confidence of that famous general, who sent him to France to negotiate the re-establishment of James II. upon the throne of England; but that project being dropped, he returned to Sweden, followed Charles XII. in his expedition to Norway, and served under him at the siege of Frederickshall, where that prince was killed, Dec. 11, 1718. Folard then returned to France; and made his last campaign in 1719, under the duke of Berwick, in quality of colonel. From that time he applied himself intently to the study of the art military as far as it could be studied at home; and built his theories upon the foundation of his experience and observations on facts. He contracted an intimacy with count Saxe, who, as he then declared, would one day prove a very great general. He was chosen a fellow of the Royal Society at London in 1749; and, in 1751, made a journey to Avignon, where he died in 1752, aged 83 years. He was the author of several works, the principal of which are, 1. Commentaries upon Polybius, in six volumes, 4to. 2. A Book of new Discoveries in War. 3. A Treatise concerning the Defence of Places, &c. in French. Those who would know more of this eminent soldier, may consult a French piece, intitled,

Folard:

Folc-lands titled, *Memoirs pour servir a l'Histoire de M. de Chevalier de Folard*. Ratisbone, 1753, 12mo.

Folengio. FOLC-LANDS, (Sax.) copy-hold lands so called in the time of the Saxons, as charter-lands were called *boc-lands*, Kitch. 173. *Folkland* was *terra vulgi* or *popularis*; the land of the vulgar people, who had no certain estate therein, but held the same, under the rents and services accustomed or agreed, at the will only of their lord the thane; and it was therefore not put in writing, but accounted *prædium rusticum et ignobile*. Spelm. of Feuds, c. 5.

FOFLCMOTE, or FOLKMOTE, (Sax. *Folcgemot*, i. e. *conventus populi*), is compounded of *folk* *populus*, and *mote*, or *gemote convenire*; and signified originally, as Soamer in his Saxon Dictionary informs us, a general assembly of the people, to consider of and order matters of the commonwealth. And Sir Henry Spelman says, the *folcmote* was a sort of annual parliament, or convention of the bishops, thanes, aldermen, and freemen, upon every May-day yearly; where the laymen were sworn to defend one another and the king, and to preserve the laws of the kingdom; and then consulted of the common safety. But Dr Brady infers from the laws of the Saxon kings of England, that it was an inferior court, held before the king's *reeve* or steward, every month, to do *folk* right, or compose smaller differences, from whence there lay appeal to the superior courts; *Gloss.* p. 48. Squire seems to think the *folcmote* not distinct from the *shiremote*, or common general meeting of the county. See his *Angl. Sax. Gov.* 155. n.

Manwood mentions *folcmote* as a court holden in London, wherein all the *folk* and people of the city did complain of the mayor and aldermen, for misgovernment within the said city; and this word is still in use among the Londoners, and denotes *celebrem ex tota civitate conventum*. Stow's Survey. According to Kennet, the *folcmote* was a common-council of all the inhabitants of a city, town, or borough, convened often by sound of bell, to the *Mote Hall*, or *House*; or it was applied to a larger congress of all the freemen within a county, called the *shire-mote*, where formerly all knights and military tenants did fealty to the king, and elected the annual sheriff on the 1st of October; till this popular election, to avoid tumults and riots, devolved to the king's nomination, anno 1315, 3 Edw. 1. After which the city *folcmote* was swallowed up in a select committee or common-council, and the country *folcmote* in the sheriff's tourn and assises.

The word *folcmote* was also used for any kind of popular or public meeting; as of all the tenants at the *court-leet*, or *court-baron*, in which signification it was of a less extent. *Paroch. Antiq.* 120.

FOLENGIO (Theophilus), of Mantua, known also by the title of *Merlin Coccaye*, an Italian poet, remarkable for giving to a poem a name which has been adopted ever since for all trifling performances of the same species, consisting of buffoonry, puns, anagrams, wit without wisdom, and humour without good-sense. His poem was called *The Macaroni*, from an Italian cake of the same name, which is sweet to the taste, but has not the least alimentary virtue, on the contrary palls the appetite and cloyes the stomach. These idle poems, however, became the reigning taste in Italy and in France: they gave birth to macaroni acad-

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mies; and, reaching England, to macaroni clubs: till, in the end, every thing insipid, contemptible, and ridiculous, in the character, dress, or behaviour, of both men and women, is now fumed up in the despicable appellation of a *macaroni*. Folengio died in 1544.

FOLIA, among botanists, particularly signify the leaves of plants; those of flowers being expressed by the word *petals*. See LEAF.

FOLIAGE, a cluster or assemblage of flowers, leaves, branches, &c.

FOLIAGE, is particularly used for the representations of such flowers, leaves, branches, rinds, &c. whether natural or artificial, as are used for enrichments on capitals, friezes, pediments, &c.

FOLIATING of LOOKING-GLASSES, the spreading the plates over, after they are polished, with quicksilver, &c. in order to reflect the image. It is performed thus: A thin blotting paper is spread on the table, and sprinkled with fine chalk; and then a fine lamina or leaf of tin, called *foil*, is laid over the paper; upon this is poured mercury, which is to be distributed equally over the leaf with a hare's-foot or cotton: over this is laid a clean paper, and over that the glass-plate, which is pressed down with the right-hand, and the paper drawn gently out with the left: this being done, the plate is covered with a thicker paper, and loaded with a greater weight than the superfluous mercury may be driven out and the tin adhere more closely to the glass. When it is dried, the weight is removed, and looking-glass is complete.

Some add an ounce of marcasite, melted by the fire; and, lest the mercury should evaporate in smoke, they pour it into cold water; and when cooled, squeeze through a cloth, or through leather.

Some add a quarter of an ounce of tin and lead to the marcasite, that the glass may dry the sooner.

FOLIATING of Globe Looking-glasses, is done as follows: Take five ounces of quicksilver and one ounce of bismuth; of lead and tin, half an ounce each: first put the lead and tin into fusion, then put in the bismuth; and when you perceive that in fusion too, let it stand till it is almost cold, and pour the quicksilver into it: after this, take the glass-globe, which must be very clean, and the inside free from dust: make a paper-funnel, which put into the hole of the globe, as near the glass as you can, so that the amalgam, when you pour it in, may not splash, and cause the glass to be full of spots; pour it in gently, and move it about, so that the amalgam may touch every where: if you find the amalgam begin to be curdly and fixed, then hold it over a gentle fire, and it will easily flow again; and if you find the amalgam too thin, add a little more lead, tin, and bismuth to it. The finer and clearer your globe is, the better will the looking-glass be.

Dr Shaw observes, that this operation has considerable advantages, as being performable in the cold; and that it is not attended with the danger of poisonous fumes from arsenic, or other unwholesome matters, usually employed for this purpose: besides, how far it is applicable to the more commodious foliating of the common looking glasses, and other speculums, he thinks, may deserve to be considered.

FOLIO, in merchants books, denotes a page, or rather both the right and left hand pages, these being

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Folia.

Folio.

Folio
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Follis.

expressed by the same figure, and corresponding to each other. See BOOK-KEEPING.

FOLIO, among printers and booksellers, the largest form of books, when each sheet is so printed that it may be bound up in two leaves only.

FOLIS. See FOLLIS.

FOLIUM, or LEAF, in botany. See LEAF.

FOLKES (Martin), an English antiquary, mathematician, and philosopher, was born at Westminster about 1690; and was greatly distinguished as a member of the Royal Society in London, and of the Academy of Sciences at Paris. He was admitted into the former at 24 years of age; made one of their council two years after; named by Sir Isaac Newton himself as vice-president; and, after Sir Hans Sloane, became president. There are numerous Memoirs of his in the Philosophical Transactions. Coins, ancient and modern, were a great object with him; and his last production was a book upon the English Silver Coin, from the conquest to his own times. He died at London in 1754. Dr Birch had drawn up materials for a life of Mr Folkes, which are preserved at large in the Anecdotes of Bowyer, p. 562. *et seq.*

FOLKESTONE, a town of Kent, between Dover and Hythe, 72 miles from London, appears to have been a very ancient place, from the Roman coins and British bricks often found in it. Stillingfleet and Tanner take it for the *Lapis Tituli* of Nennius. It was burnt by Earl Godwin, and by the French in the reign of Edward III. It had five churches, now reduced to one. It is a member of the town and port of Dover; and has a weekly market and an annual fair. It is chiefly noted for the multitude of fishing-boats that belong to its harbour, which are employed in the season in catching mackerel for London; to which they are carried by the mackerel-boats of London and Barking. About Michaelmas, the Folkestone-barks, with others from Sussex, go away to the Suffolk and Norfolk coasts, to catch herrings for the merchants of Yarmouth and Lowestoff. Folkestone gives title of *Viscount* to William Henry Bouverie, whose grandfather, Jacob, was so created in 1747. It has been observed of some hills in this neighbourhood, that they have visibly sunk and grown lower within memory.

FOLKLAND, and FOLKNOTE. See FOLCLAND.

FOLLICULUS, (from *follis*, "a bag,") a species of seed-vessel first mentioned by Linnæus in his *Delineatio plantæ*, generally consisting of one valve, which opens from bottom to top on one side, and has no suture for fastening or attaching the seeds within it.

FOLLICULI are likewise defined by the same author to be small glandular vessels distended with air, which appear on the surface of some plants; as at the root of water-milfoil, and on the leaves of aldrovanda. In the former, the vessels in question are roundish, and furnished with an appearance like two horns; in the latter, pot-shaped, and semicircular.

FOLLIS, or FOLIS, anciently signified a little bag or purse; whence it came to be used for a sum of money, and very different sums were called by that name: thus the scholiast on the Basilics, mentions a follis of copper which was worth but the 24th part of the miliarensis; the glossæ nomicæ, quoted by Gronovius and others, one of 125 miliarensis, and another of 250

denarii, which was the ancient sestertium; and three different sums of eight, four, and two pounds of gold, were each called *follis*. According to the account of the scholiast, the ounce of silver, which contained 5 miliarensis of 60 in the pound, was worth 120 follis of copper. The glossographer, describing a follis of 250 denarii, says it was equal to 312 pounds 6 ounces of copper; and as the denarius of that age was the 8th part of an ounce, an ounce of silver must have been worth 120 ounces of copper; and therefore the scholiast's follis was an ounce of copper, and equal to the glossographer's nummus. But as Constantine's copper money weighed a quarter of a Roman ounce, the scholiast's follis and the glossographer's nummus contained four of them, as the ancient nummus contained four asses.

FOLLY, according to Mr Locke, consists in the drawing of false conclusions from just principles; by which it is distinguished from madness, which draws just conclusions from false principles.

But this seems too confined a definition; *folly*, in its most general acceptation, denoting a weakness of intellect or apprehension, or some partial absurdity in sentiment or conduct.

FOMAHANT, in astronomy, a star of the first magnitude in the constellation AQUARIUS.

FOMENTATION, in medicine, is a fluid externally applied, usually as warm as the patient can bear it, and in the following manner. Two flannel cloths are dipped into the heated liquor, one of which is wrung as dry as the necessary speed will admit, then immediately applied to the part affected; it lies on until the heat begins to go off, and the other is in readiness to apply at the instant in which the first is removed: thus these flannels are alternately applied, so as to keep the affected part constantly supplied with them warm. This is continued 15 or 20 minutes, and repeated two or three times a-day.

Every intention of relaxing and soothing by fomentations may be answered as well by warm water alone as when the whole tribe of emollients are boiled in it; but when discutients or antiseptics are required, such ingredients must be called in as are adapted to that end.

The degree of heat should never exceed that of producing a pleasing sensation; great heat produces effects very opposite to that intended by the use of fomentations.

FONG-YANG, a city of China, in the province of KIANG-Nan. It is situated on a mountain, which hangs over the yellow river, and incloses with its walls several fertile little hills. Its jurisdiction is very extensive: for it comprehends 18 cities; 5 of which are of the second, and 13 of the third class. As this was the birth-place of the emperor Hong-you, chief of the preceding dynasty, this prince formed a design of rendering it a famous and magnificent city, in order to make it the seat of empire. After having expelled the western Tartars, who had taken possession of China, he transferred his court hither, and named the city *Fong-yang*; that is to say, "The Place of the Eagle's Splendor." His intention, as we have said, was to beautify and enlarge it; but the inequality of the ground, the scarcity of fresh water, and above all the vicinity of his father's tomb, made him change his design. By the

Folly
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Fong-yang.

Fong-yang
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Fontaine.

the unanimous advice of his principal officers, this prince established his court at NAN-KING, a more beautiful and commodious place. When he had formed this resolution, a stop was put to the intended works: the imperial palace which was to have been inclosed by a triple wall, the walls of the city to which a circumference of nine leagues were assigned, and the canals that were begun, all were abandoned; and nothing was finished but three monuments; which still remain. The extent and magnificence of these sufficiently show what the beauty of this city would have been had the emperor pursued his original design. The first is the tomb of the father of Hong-you, to decorate which no expence was spared; it is called *Hoan-lin*, or the *Royal Tomb*. The second is a tower built in the middle of the city, which is of an oblong form, and 100 feet high. The third is a magnificent temple erected to the god Fo. At first it was only a pagod, to which Hong-you retired after having lost his parents, and where he was admitted as an inferior domestic; but, having soon become weary of this kind of life, he enlisted with the chief of a band of banditti, who had revolted from the Tartars. As he was bold and enterprising, the general made choice of him for his son-in-law; soon after he was declared his successor by the unanimous voice of the troops. The new chief, seeing himself at the head of a large party, had the presumption to carry his views to the throne. The Tartars, informed of the progress of his arms, sent a numerous army into the field: but he surprised and attacked them with so much impetuosity, that they were obliged to fly; and though they several times returned to the charge, they were still defeated, and at length driven entirely out of China. As soon as he mounted the throne, he caused the superb temple which we have mentioned to be raised out of gratitude to the Bonzes, who had received him in his distress, and assigned them a revenue sufficient for the maintenance of 300 persons, under a chief of their own sect, whom he constituted a mandarin, with power of governing them, independent of the officers of the city. This pagod was supported as long as the preceding dynasty lasted; but that of the eastern Tartars, which succeeded, suffered it to fall to ruin.

Fong-Ghoui, the name of a ridiculous superstition among the Chinese. See CHINA, n^o 105.

FONT, among ecclesiastical writers, a large basin, in which water is kept for the baptizing of infants or other persons.

FONT, in the art of printing, denotes a complete assortment of letters, accents, &c. used in printing. See FOUNT.

FONTAINE (John), the celebrated French poet, and one of the first rate geniuses of his age, was born at Chateau Thierry in Champagne, the 8th of July 1621, of a good extraction. At the age of 19 he entered amongst the Oratorians, but quitted that order 18 months after. He was 22 years of age before he knew his own talents for poetry; but hearing an ode of Malherbe read, upon the assassination of Henry IV. he was so taken with admiration of it, that the poetical fire, which had before lain dormant within him, seemed to be enkindled from that of the other great poet. He applied himself to read, to meditate, to repeat, in fine, to imitate, the works of Malherbe. The

first essays of his pen he confined to one of his relations, who made him read the best Latin authors, Horace, Virgil, Terence, Quintilian, &c. and then the best compositions in French and Italian. He applied himself likewise to the study of the Greek authors, particularly Plato and Plutarch. Some time afterwards his parents made him marry a daughter of a lieutenant-general, a relation of the great Racine. This young lady, besides her very great beauty, was remarkable for the delicacy of her wit, and Fontaine never composed any work without consulting her. But as her temper was none of the best, to avoid dissention, he separated himself from her company as often as he well could. The famous duchess of Bouillon, niece to cardinal Mazarine, being exiled to Chateau Thierry, took particular notice of Fontaine. Upon her recall, he followed her to Paris; where, by the interest of one of his relations, he got a pension settled upon him. He met with great friends and protectors amongst the most distinguished persons of the court, but madam de la Sabliere was the most particular. She took him to live at her house; and it was then that Fontaine, divested of domestic concerns, led a life conformable to his disposition, and cultivated an acquaintance with all the great men of the age. It was his custom after he was fixed at Paris, to go every year, during the month of September, to his native place of Chateau-Thierry, and pay a visit to his wife, carrying with him Racine, Despreaux, Chappelle, or some other celebrated writers. When he has sometimes gone thither alone by himself, he has come away without remembering even to call upon her; but seldom omitted selling some part of his lands, by which means he squandered away a considerable fortune. After the death of madame de la Sabliere he was invited into England, particularly by madame Marazin, and by St Evremond, who promised him all the sweets and comforts of life; but the difficulty of learning the English language, and the liberality of the duke of Burgundy, prevented his voyage.

About the end of the year 1692 he fell dangerously ill: and as it is customary upon these occasions in the Romish church, he made a general confession of his whole life to P. Pogue, an oratorian, and before he received the sacrament, he sent for the gentlemen of the French academy, and in their presence declared his sincere compunction for having composed his *Tales*; a work he could not reflect upon without the greatest repentance and detestation; promising, that if it should please God to restore his health, he would employ his talents only in writing upon matters of morality or piety. He survived this illness two years, living in the most exemplary and edifying manner, and died the 13th of March 1695, being 74 years of age. When they stripped his body, they found next his skin a hair shirt; which gave room for the following expression of the younger Racine:

Et l'Auteur de Jaconda est orme d'un Cilice.

Fontaine's character is remarkable for a simplicity, candour, and probity, seldom to be met with. He was of an obliging disposition; cultivating a real friendship with his brother poets and authors; and, what is very rare, beloved and esteemed by them all. His conversation was neither gay nor brilliant, especially when he was not among his intimate friends. One

Fontaine, day being invited to dinner at a farmer-general's, he eat a great deal, but did not speak. Rising up from table very early, under pretext of going to the academy, one of the company represented to him that it was not yet a proper time: "Well (says he), if it is not, I will stay a little longer." He had one son by his wife in the year 1660. At the age of 14, he put him into the hands of M. de Harley, the first president, recommending to him his education and fortune. It is said that having been a long time without seeing him, he happened to meet him one day visiting, without recollecting him again, and mentioned to the company that he thought that young man had a good deal of wit and understanding. When they told him it was his own son, he answered in the most tranquil manner, "Ha! truly I am glad on't." An indifference, or rather an absence of mind, influenced his whole conduct, and rendered him often insensible to the inclemency of the weather. Madame de Bouillon going one morning to Versailles, saw him, abstracted in thought, sitting in an arbour; returning at night she found him in the same place, and in the same attitude, although it was very cold and had rained almost the whole day. He carried this simplicity so far, that he was scarce sensible of the bad effects some of his writings might occasion, particularly his tales. In a great sickness, his confessor exhorting him to prayer and alms-deeds: "As for alms-deeds (replied Fontaine), I am not able, having nothing to give; but they are about publishing a new addition of my Tales, and the bookseller owes me a hundred copies; you shall have them to sell, and distribute their amount amongst the poor." Another time P. Poguët exhorting him to repent of his faults, "If he has committed any (cried the nurse), I am sure it is more from ignorance than malice, for he has as much simplicity as an infant." One time having composed a tale, wherein he made a profane application of these words of the Gospel, "Lord, five talents thou didst deliver to me," he dedicated, it by a most ingenious prologue, to the celebrated Arnauld telling him, it was to show to posterity the great esteem he had for the learned doctor. He was not sensible of the indecency of the dedication, and the profane application of the text, till Boileau and Racine represented it to him. He addressed, another, by a dedication in the same manner to the archbishop of Paris. His Fables are an immortal work, exceeding every thing in that kind, both ancient and modern, in the opinion of the learned. People of taste, the oftener they read them, will find continually new beauties and charms, not to be met with elsewhere. The descendants of this great poet are exempted in France from all taxes and impositions, a privilege which the intendants of Soissons to this day think it an honour to confirm to them.

FONTAINBLEAU, a town in the Isle of France, and in the Gatinois, remarkable for its fine palace, which has been the place where the kings of France used to lodge when they went a-hunting. It was first embellished by Francis I. and all the successive kings have added something thereto; insomuch that it may now be called the finest pleasure-house in the world. It stands in the midst of a forest, consisting of 26,424 arpents of land, each containing 100 square perches, and each perch 18 feet. E. Long. 2. 33. N. Lat. 40. 22.

FONTAINES (Peter Francis), a French critic, was born of a good family at Rouen in 1685. At 15, he entered in to the society of the Jesuits; and at 30, he quitted it, for the sake of returning to the world. He was a priest and had a cure in Normandy; but left it, and was, as a man of wit and letters, some time with the cardinal d'Auvergne. Having excited some attention at Paris by certain critical productions, the Abbé Bignon in 1724 committed to him the *Journal des Sçavans*. He acquitted himself well in the department, and was peaceably enjoying the applauses of the public, when his enemies, whom by critical strictures in his Journal he had made such, formed an accusation against him of a most abominable crime, and procured him to be imprisoned. By the credit of powerful friends, he was set at liberty in 15 days: the magistrate of the police took upon himself the trouble of justifying him in a letter to the Abbé Bignon; and this letter having been read amidst his fellow-labourers in the Journal, he was unanimously re-established in his former credit. This happened in 1725. But with whatever repute he might acquit himself in this Journal, frequent disgusts made him frequently abandon it. He laboured mean while in some new periodical works, from which he derived his greatest fame. In 1731, he began one under the title of *Nouvelles du Parnasse, ou Reflexions sur les Ouvrages nouveaux*; but only proceeded to two volumes; the work having been suppressed by authority, from the incessant complaints of authors ridiculed therein. About three years after, in 1735, he obtained a new privilege for a periodical production, intitled, *Observations sur les Ecrits Modernes*: which, after continuing to 33 volumes, was suppressed again in 1743. Yet the year following, 1744, he published another weekly paper called, *Jugemens sur les Ouvrages nouveaux*, and proceeded to 11 volumes: the two last being done by other hands. In 1745, he was attacked with a disorder in the breast, which ended in a dropsy that proved fatal in five weeks. "He was (says M. Freron) born a sentimental person; a philosopher in conduct as well as in principle; exempt from ambition; and of a noble firm spirit, which would not submit to sue for preferments or titles. In common conversation he appeared only a common man; but when subjects of literature, or any thing out of the ordinary way, were agitated, he discovered great force of imagination and wit." Besides the periodical works mentioned above, he was the author of many others: his biographer gives us no less than 17 articles; many of them critical, some historical, and some translations from English writers, chiefly from Pope, Swift, Fielding, &c. The Abbé de la Porte, published, in 1757, *L'Esprit de l'Abbé des Fontaines*, in 4 vols 12mo; prefixed to which is the Life of Fontaines, a catalogue of his works, and another catalogue of writings against him.

FONTANELLA, in anatomy, imports the quadrangular aperture found betwixt the os frontis and ossa sincipitis, in children just born; which is also called *fonticulus*.

FONTARABIA, a sea port town of Spain in Biscay, and in the territory of Guipuscoa, seated on a peninsula on the sea shore, and on the river Bidassoa. It is small, but well fortified both by nature and art: and has a good harbour, though dry at low water. It

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Fontenay is built in the form of an amphitheatre, on the declivity of an hill, and surrounded on the land side by the high Pyrenean mountains. It is a very important place, being accounted the key of Spain on that side. W. Long. 1. 43. N. Lat. 43. 23.

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Fonte-
vraud.

FONTENAY, (John Baptist Blain de), a very famous painter of fruit and flowers, was born at Caen in 1654. Louis XIV. gave him a pension, and an apartment in the galleries of the Louvre; and he was nominated counsellor of the Academy of Painting. His fruit and flowers have all the freshness and beauty of nature; the very dew seems to trickle down their stalks, with all the lustre and transparency of the diamond, while the insects upon them seem perfectly alive and animated. This ingenious painter died at Paris in 1715.

FONTENELLE, (Bernard de), a celebrated French author, was born in 1657, and died in 1756, when he was near 100 years old. He discharged the trust of perpetual secretary to the Academy of Sciences above 40 years with universal applause; and his History of the Academy of Sciences throws a great light upon their memoirs, which are very obscure. The eulogies which he pronounced on the deceased members of the academy, have this peculiar merit, that they excite a respect for the sciences as well as for the author. In his poetical performances, and the Dialogues of the Dead, the spirit of Voiture was discernible, though more extended and more philosophical. His *Plurality of Worlds*, is a work singular in its kind; the design of which was to present that part of philosophy to view in a gay and pleasing dress. In his most advanced years, he published comedies, which, though they showed the elegance of Fontenelle, were little fitted for the stage; and *An Apology for Des Cartes's Vortices*. M. de Voltaire, who declares him to have been the most universal genius the age of Louis XIV. produced, says, "We must excuse his comedies, on account of his great age; and his Cartesian opinions, as they were those of his youth, when they were universally received all over Europe."

FONTENOY, a town or village of the Austrian Netherlands, in the province of Hainault, and on the borders of Flanders; remarkable for a battle fought there between the allies and the French on the first of May 1745. The French were commanded by Marshal Saxe, and the allies by the Duke of Cumberland. The latter behaved with great bravery; but through the superiority of the numbers of the French army, and likewise the superior generalship of their commander, the allies were defeated with great slaughter. The British troops behaved with astonishing intrepidity, as their enemies themselves owned. It is even said, that the battle was lost through the cowardice of the Dutch, who failed in their attack on the village of Fontenoy, on which the event of the day depended. E. Long. 2. 20. N. Lat. 50. 25.

FONTENOY, a village of France, in the duchy of Burgundy, remarkable for a bloody battle fought there in 841, between the Germans and the French, in which were killed above 100,000 men; and the Germans were defeated. E. Long. 3. 48. N. Lat. 47. 28.

FORTEVRAUD, or **FORTEVAUX** (Order of), in ecclesiastical history, a religious order instituted by Robert d'Arbrissel, about the latter end of the 11th cen-

tury, and taken under the protection of the holy see by pope Pascal II. in 1106, confirmed by a bull in 1113, and invested by his successors with very extraordinary privileges. The chief of this order is a female, who is appointed to inspect both the monks and nuns. The order is divided into four provinces, which are those of France, Aquitaine, Auvergne, and Bretagne, in each of which they have several priories.

FONTICULUS, or **FONTANELLA**, in surgery, an issue, seton, or small ulcer, made in various parts of the body, in order to eliminate the latent corruption out of it.

FONTINALIA, or **FONTANALIA**, in antiquity, a religious feast held among the Romans in honour of the deities who presided over fountains or springs. Varro observes, that it was the custom to visit the wells on those days, and to cast crowns into fountains. Scaliger, in his conjectures on Varro, takes this not to be a feast of fountains in general, as Festus insinuates, but of the fountain which had a temple at Rome, near the Porta Capena, called also *Porta Fontinalis*: he adds, that it is of this fountain Cicero speaks in his second book *De legib.* The fontinalia were held on the 13th of October.

FONTINALIS, **WATER-MOSS**, in botany: A genus of the natural order of musci, belonging to the cryptogamia class of plants. The anthera is hooded; the calyptra, or covering of the anthera, sessile, inclosed in a perichæcium or empalement of leaflets different from those of the rest of the plant. There are four species, all of them natives of Britain. They grow on the brinks of rivulets, and on the trunks of trees. The most remarkable is the antipyretica, with purple stalks. The Scandinavians line the insides of their chimneys with this moss, to defend them against the fire; for contrary to the nature of all other moss, this is scarcely capable of burning.

FOOD, in the most extensive signification of the word, implies whatever aliments are taken into the body, whether solid or fluid; but, in common language, it is generally used to signify only the solid part of our aliment.

We are told, that in the first ages men lived upon acorns, berries, and such fruits as the earth spontaneously produces; then they proceeded to eat the flesh of wild animals taken in hunting: But their numbers decreasing, and mankind multiplying, necessity taught them the art of cultivating the ground, to sow corn, &c. By and by they began to assign to each other, by general consent, portions of land to produce them their supply of vegetables; after this, reason suggested the expedient of domesticating certain animals, both to assist them in their labours and supply them with food. Hogs were the first animals of the domestic kind that appeared upon their tables; they held it to be ungrateful to devour their beasts that assisted them in their labours.—When they began to make a free use of domestic animals, they roasted them only; boiling was a refinement in cookery which for ages they were strangers to; and fish living in an element men were unused to, were not eaten till they grew somewhat civilized. Menelaus complains, in the *Odyssey*, that they had been constrained to feed upon them.

The most remarkable distinction of foods, in a medical view, is into those which are already assimilated into

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Food. into the animal nature, and such as are not. Of the first kind are animal substances in general; which if not entirely similar, are nearly so, to our nature. The second comprehends vegetables, which are much more difficultly assimilated. But as the nourishment of all animals, even those which live on other animals, can be traced originally to the vegetable kingdom, it is plain, that the principle of all nourishment is in vegetables.

*Cullen on the
Mat. Med.
1st edit.*

Though there is perhaps no vegetable which does not afford nourishment to some species of animals or other; yet, with regard to mankind, a very considerable distinction is to be made. Those vegetables which are of a mild, bland, agreeable taste, are proper nourishment; while those of an acrid, bitter, and nauseous nature, are improper. We use, indeed, several acrid substances as food; but the mild, the bland, and agreeable, are in the largest proportion in almost every vegetable. Such as are very acrid, and at the same time of an aromatic nature, are not used as food, but as spices or condiments, which answer the purposes of medicine rather than any thing else. Sometimes, indeed, acrid and bitter vegetables seem to be admitted as food. Thus celeri and endive are used in common food, though both are substances of considerable acrimony; but it must be observed, that, when we use them, they are previously blanched, which almost totally destroys their acrimony. Or if we employ other acrid substances, we generally, in a great measure, deprive them of their acrimony by boiling. In different countries the same plants grow with different degrees of acrimony. Thus, garlic here seldom enters our food; but in the southern countries, where the plants grow more mild, they are frequently used for that purpose. The plant which furnishes cassava, being very acrimonious, and even poisonous, in its recent state, affords an instance of the necessity of preparing acrid substances even in the hot countries: and there are other plants, such as arum-root, which are so exceedingly acrimonious in their natural state, that they cannot be swallowed with safety; yet, when deprived of that acrimony, will afford good nourishment.

The most remarkable properties of different vegetable substances as food, are taken notice of under their different names; here we shall only compare vegetable foods in general with those of the animal kind.

I. *In the Stomach*, they differ remarkably, in that the vegetables always have a tendency to acidity, while animal food of all kinds tend rather to alkalescency and putrefaction. Some animal foods, indeed, turn manifestly acid before they putrify; and it has been asserted, that some degree of acescency takes place in every kind of animal food before digestion. This acescency of animal food, however, never comes to any morbid degree, but the disease is always on the side of putrefaction. The acescency of vegetables is more frequent, and ought to be more attended to, than the alkalescency of animal food; which last, even in weak stomachs, is seldom felt; while acescency greatly affects both the stomach and system.

With regard to their difference of *solution*:—Heaviness, as it is called, is seldom felt from vegetables, except from tough farinaceous paste, or the most viscid substances; while the heaviness of animal food is more frequently noticed, especially when in any great quan-

Food. tity. Difficulty of solution does not depend so much on firmness of texture (as a man, from fish of all kinds, is more oppressed than from firmer substances) as on viscosity; and hence it is more frequent in animal food, especially in the younger animals.

With regard to *mixture*:—There is no instance of difficult mixture in vegetables, except in vegetable oils; while animal foods, from both viscosity and oiliness, especially the fatter meats, are refractory in this respect. Perhaps the difference of animal and vegetable foods might be referred to this head of mixture. For vegetable food continues long in the stomach, giving little stimulus: Now the system is affected in proportion to the extent of this stimulus, which is incomparably greater from the animal viscid oily food, than from the vegetable, firmer, and more aqueous. However, there are certain applications to the stomach, which have a tendency to bring on the cold fit of fever, independent of stimulus, merely by their refrigeration: and this oftener arises from vegetables; as we see, in those hot countries where intermittents prevail, they are oftener induced from a surfeit of vegetable than of animal food. A proof of this is, that when one is recovering of an intermittent, there is nothing more apt to cause a relapse than cold food, especially if taken on those days when the fit should return, and particularly acescent, fermentable vegetables, as salad, melons, cucumbers, &c. *acido dulces*, &c. which according to Dr Cullen, are the most frequent causes of epidemics; therefore, when an intermittent is to be avoided, we shun vegetable diet, and give animal foods, although their stimulus be greater.

II. *In the Intestines*. When the putrefaction of animal food has gone too far, it produces an active stimulus, causing diarrhoea, dysentery, &c. But these effects are but rare: whereas from vegetable food and its acid, which, united with the bile, proves a pretty strong stimulus, they more frequently occur; but, luckily, are of less consequence, if the refrigeration is not very great. In the autumnal season, when there is a tendency to dysentery, if it is observed that eating of fruits brings it on, it is rather to be ascribed to their cooling than stimulating the intestines.

As to *stool*—Wherever neither putrefaction nor acidity has gone a great length, animal food keeps the belly more regular. Vegetable food gives a greater proportion of feculent matter, and, when exsiccated by the stomach and intestines, is more apt to stagnate, and produce slow-belly, and costiveness, than animal stimulating food; which, before it comes to the great guts, where stoppage is made, has attained a putrefactive tendency, and gives a proper stimulus: and thus those who are costive from the use of vegetables, when they have recourse to animal food are in this respect better.

III. *In the blood-vessels*. They both give a blood of the same kind, but of different quality. Animal food gives it in greater quantity, being in great part, as the expression is, convertible in *succum et sanguineum*, and of easy digestion; whereas vegetable is more watery, and contains a portion of unconquerable saline matter, which causes it to be thrown out of the body by some excretion. Animal food affords a more dense stimulating elastic blood than vegetable; stretching and causing a greater resistance in the solids, and again exciting their stronger action. It has been supposed, that

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acescency of vegetable food is carried into the blood-vessels, and there exerts its effects; but the tendency of animal fluids is so strong to alkalescency, that the existence of acid acrimony in the blood seems very improbable. Animal food alone will soon produce an alkalescent acrimony; and if a person who lives entirely on vegetables were to take no food for a few days, his acrimony would be alkalescent.

IV. We are next to take notice of the *quantity of nutriment* these different foods afford. Nutriment is of two kinds: the first repairs the waste of the solid fibres: the other supplies certain fluids, the chief of which is oil. Now, as animal food is easier converted, and also longer retained in the system, and as it contains a greater proportion of oil, it will afford both kinds of nutriment more copiously than vegetables.

V. Lastly, *As to the different degrees of perspirability of these foods.* This is not yet properly determined. Sanctorius constantly speaks of mutton as the most perspirable of all food, and of vegetables as checking perspiration. This is a consequence of the different stimulus those foods give to the stomach, so that persons who live on vegetables have not their perspiration so suddenly excited. In time of digestion, perspiration is stopped from whatever food, much more so from cooling vegetables. Another reason why vegetables are less perspirable is, because their aqueo-saline juices determine them to go off by urine, while the more perfectly mixed animal food is more equally diffused over the system, and so goes off by perspiration. Hence Sanctorius's accounts may be understood; for vegetable aliment is not longer retained in the body, but mostly takes the course of the kidneys. Both are equally perspirable in this respect, viz. that a person living on either, returns once a-day to his usual weight; and if we consider the little nourishment of vegetables, and the great tendency of animal food to corpulency, we must allow that vegetable is more quickly perspired than animal food.

As to the question, Whether man was originally designed for animal or vegetable food, see the article **CARNIVOROUS**.

With regard to the effects of these foods on men, it must be observed, that there are no persons who live entirely on vegetables. The Pythagoreans themselves eat milk; and those who do so mostly, as these Pythagoreans, are weakly, sickly, and meagre, labouring under a constant diarrhoea and several other diseases. None of the hardy, robust, live on these; but chiefly such as gain a livelihood by the exertion of their mental faculties, as (in the East-Indies) factors and brokers; and this method of life is now confined to the hot climates, where vegetable diet, without inconvenience, may be carried to great excess. Though it be granted, therefore, that man is intended to live on these different foods promiscuously, yet the vegetable should be in very great proportion. Thus the Laplanders are said to live entirely on animal food: but this is contradicted by the best accounts; for Linnæus says, that besides milk, which they take sour, to obviate the bad effects of animal food, they use also calla, menyanthes, and many other plants, copiously. So there is no instance of any nation living entirely either on vegetable or animal food, though there are indeed some who live particularly on one or other in the great-

est proportion. In the cold countries, *e. g.* the inhabitants live chiefly on animal food, on account of the rigour of the season, their smaller perspiration, and little tendency to putrefaction.

Of more importance, however, is the following than the former question, viz. *In what proportion animal and vegetable food ought to be mixed?*

I. *Animal food* certainly gives most strength to the system. It is a known aphorism of Sanctorius, that *pondus addit robur*; which may be explained from the impletion of the blood-vessels, and giving a proper degree of tension for the performance of strong oscillations. Now, animal food not only goes a greater way in supplying fluid, but also gives the fluid more dense and elastic. The art of giving the utmost strength to the system is best understood by those who breed fighting cocks. These people raise the cocks to a certain weight, which must bear a certain proportion to the other parts of the system, and which at the same time is so nicely proportioned, as that, on losing a few ounces of it, their strength is very considerably impaired. Dr Robinson of Dublin has observed, that the force and weight of the system ought to be determined by the largeness of the heart, and its proportion to the system: for a large heart will give large blood-vessels, while at the same time the viscera are less, particularly the liver; which last being increased in size, a greater quantity of fluid is determined into the cellular texture, and less into the sanguineous system.—Hence we see how animal food gives strength, by filling the sanguiferous vessels. What pains we now bestow on cocks, the ancients did on the *Athletæ*, by proper nourishment bringing them to a great degree of strength and agility. It is said, that men were at first fed on figs, a proof of which we have from their nutritious quality: however, in this respect they were soon found to fall far short of animal food; and thus we see, that men, in some measure, will work in proportion to the quality of their food. The English labour more than the Scots; and wherever men are exposed to hard labour, their food should be animal. Animal food, although it gives strength, yet loads the body; and Hippocrates long ago observed, that the athletic habit, by a small increase, was exposed to the greatest hazards. Hence it is only proper for bodily labours, and entirely improper for mental exercises; for whoever would keep his mind acute and penetrating, will exceed rather on the side of vegetable food. Even the body is oppressed with animal food; a full meal always produces dulness, laziness, and yawning; and hence the feeding of gamesters, whose mind must be ready to take advantage, is always performed by avoiding a large quantity of animal food. Farther, with regard to the strength of the body, animal food in the first stage of life is hardly necessary to give strength; in manhood, when we are exposed to active scenes, it is more allowable; and even in the decline of life, some proportion of it is necessary to keep the body in vigour. There are some diseases which come on in the decay of life, at least are aggravated by it; among these the most remarkable is the gout. This, when it is in the system, and does not appear with inflammation in the extremities, has pernicious effects there, attacking the lungs, stomach, head, &c. Now, to determine this to the extremities, a large proportion of

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Food. of animal food is necessary, especially as the person is commonly incapable of much exercise.

Animal food, although it gives strength, is yet of many hazards to the system, as it produces plethora and all its consequences. As a stimulus to the stomach and to the whole system, it excites fever, urges the circulation, and promotes the perspiration. The system, however, by the repetition of these stimuli, is soon worn out; and a man who has early used the athletic diet, is either early carried off by inflammatory diseases, or, if he takes exercise sufficient to render that diet salutary, such an accumulation is made of putrescent fluids, as in his after-life lays a foundation for the most inveterate chronic distempers. Therefore it is to be questioned, whether we should desire this high degree of bodily strength, with all the inconveniences and dangers attending it. Those who are chiefly employed in mental researches, and not exposed to too much bodily labour, should always avoid an excess of animal food. There is a disease which seems to require animal food, viz. the hysteric or hypochondriac; and which appears to be very much a-kin to the gout, affecting the alimentary canal. All people affected with this disease are much disposed to acescency; which sometimes goes so far, that no other vegetable but bread can be taken in, without occasioning the worst consequences. Here then we are obliged to prescribe an animal diet, even to those of very weak organs; for it generally obviates the symptoms. However, several instances of scurvy in excess have been produced by a long-continued use of this diet, which it is always unlucky to be obliged to prescribe, and when it is absolutely necessary to prescribe, it should be joined with as much of the vegetable as possible, and when a cure is performed we should gradually recur to that again.

2. Next, let us consider the *vegetable* diet. The chief inconveniency of this is difficulty of assimilation; which however, in the vigorous and exercised, will not be liable to occur. In warm climates, the assimilation of vegetable aliment is more easy, so that *there* it may be more used, and when joined to exercise gives a pretty tolerable degree of strength and vigour; and though the general rule be in favour of *animal* diet, for giving strength, yet there are many instances of its being remarkably produced from vegetable. Vegetable diet has this advantage, that it whets the appetite, and that we can hardly suffer from a full meal of it. Besides the disorders it is liable to produce in the *prima via*, and its falling short to give strength, there seem to be no bad consequences it can produce in the blood-vessels; for there is no instance where its peculiar acrimony was ever carried there, and it is certainly less putrifiable than animal food; nor, without the utmost indolence, and a sharp appetite, does it give plethora, or any of its consequences: so that we cannot here but conclude, that a large proportion of vegetable food is useful for the generality of mankind.

There is no error more dangerous, or more common, than the neglect of bread: for it is the safest of vegetable aliment, and the best corrector of animal food; and, by a large proportion of this alone, its bad consequences, when used in a hypochondriac state, have been obviated. The French apparently have as much animal food on their tables as the Britons; and yet,

by a greater use of bread and the dried acid fruits, its bad effects are prevented: and therefore bread should be particularly used by those who are attached to animal food. Vegetable food is not only necessary to secure health, but long life: and, as we have said, in infancy and youth we should be confined to it mostly; in manhood, and decay of life, use animal food; and, near the end, vegetable again.

There is another question much agitated, viz. *What are the effects of variety in food?* Is it necessary and allowable, or universally hurtful? Variety of a certain kind seems necessary; as vegetable and animal foods have their mutual advantages, tending to correct each other. Another variety, which is very proper, is that of liquid and solid food, which should be so managed as to temper each other; and liquid food, especially of the vegetable kind, is too ready to pass off before it is properly assimilated, while solid food makes a long stay. But this does not properly belong to the question, whether variety of the same kind is necessary or proper, as in animal foods, beef, fish, fowl, &c. It doth not appear that there is any inconvenience arising from this mixture or difficulty of assimilation, provided a moderate quantity be taken. When any inconvenience does arise, it probably proceeds from this, that one of the particular substances in the mixture, when taken by itself, would produce the *same effects*; and, indeed, it would appear, that this effect is not *heightened* by the mixture, but properly *obviated* by it. There are few exceptions to this, if any, e. g. taking a large proportion of acrescent substances with milk. The coldness, &c. acidity, flatulency, &c. may appear; and it is possible that the coagulum, from the acrescent of the vegetables, being somewhat stronger induced, may give occasion to too long retention in the stomach, and to acidity in too great degree. Again, the mixture of fish and milk often occasions inconveniences. The theory of this is difficult, though, from universal consent, it must certainly be just. Can we suppose that fish gives occasion to such a coagulum as runnet? If it does so, it may produce bad effects. Besides, fishes approach somewhat to vegetables, in giving little stimulus; and are accused of the same bad effects as these, viz. bringing on the cold fit of fever.

Thus much may be said for variety. But it also has its disadvantages, provoking to gluttony; this, and the art of cookery, making men take in more than they properly can digest: and hence, perhaps, very justly, physicians have universally almost preferred simplicity of diet; for, in spite of rules, man's eating will only be measured by his appetite, and satiety is sooner produced by *one* than by *many* substances. But this is so far from being an argument against variety, that it is one for it, as the only way of avoiding a full meal of animal food, and its bad effects, is by presenting a quantity of vegetables. Another mean of preventing the bad effects of animal food, is, to take a large proportion of liquid; and hence the bad effects of animal food are little felt in Scotland, on account of their drinking much with it, and using broths, which are at once excellent correctors of animal food, and preventives of gluttony.

With regard to the differences between *ANIMAL FOODS*, properly so called, the first regards their solubility,

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lity, depending on a lax or firm texture of their different kinds.

1. SOLUBILITY of animal food seems to deserve less attention than is commonly imagined; for there are many instances of persons of a weak stomach incapable of breaking down the texture of vegetables, or even of dissolving a light pudding, to whom hung beef, or a piece of ham, was very grateful and easily digested. None of the theories given for the solution of animal-food in the human stomach seems to have explained that process sufficiently. Long ago has been discarded the supposition of an active corrosive menstruum there; and also the doctrine of trituration, for which, indeed, there seems no mechanism in the human body; and, till lately, physicians commonly agreed with Boerhaave in supposing nothing more to be necessary than a watery menstruum, moderate heat, and frequent agitation. This will account for solution in some cases, but not entirely. Let us try to imitate it out of the body with the same circumstances, and in tentimes the time in which the food is dissolved in the stomach we shall not be able to bring about the same changes. Take the coagulated white of an egg, which almost every body can easily digest, and yet no artifice shall be able to dissolve it. Hence, then, we are led to seek another cause for solution, *viz.* fermentation; a notion, indeed, formerly embraced, but on the introduction of mechanical philosophy, industriously banished, with every other supposition of that process taking place at all in the animal economy.

Many of the ancients imagined this fermentation to be putrefactive. But this we deny, as an acid is produced; though hence the fermentation might be reckoned the vinous, which, however, seems always to be morbid. Neither, indeed, is the fermentation purely acetous, but modified by putrescence; for Pringle has observed, that animal-matters raise and even expedite the acetous process. The fermentation, then, in the stomach is of a mixed nature, between the acetous and putrefactive, mutually modifying each other; though, indeed, in the intestines, somewhat of the putrefactive seems to take place, as may be observed from the state of the feces broke down, and from the little disposition of such substances to be so, which are not liable to the putrefactive process, as the firmer parts of vegetables, &c. Upon this view solution seems to be extremely easy, and those substances to be most easily broke down which are most subject to putrefaction. See ANATOMY, n^o 104. and GASTRIC Juice.

But solution also depends on other circumstances, and hence requires a more particular regard.

1. There is a difference of solubility with respect to the manducation of animal-food, for which bread is extremely necessary, in order to keep the more slippery parts in the mouth till they be properly comminuted*. From want of proper manducation persons are subject to eructations; and this more frequently from the firm vegetable foods, as apples, almonds, &c. than from the animal, though, indeed, even from animal food, very tendinous, or swallowed in unbroken masses, such sometimes occur. Manducation is so much connected with solution, that some, from imperfectly performing that, are obliged to belch up their food, remanducate it, and swallow it again before the stomach can dissolve it, or proper nourishment be extracted. Another

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proof of our regard to solubility, is our rejecting the firmer parts of animal-food, as bull-beef, and generally carnivorous animals.

2. Its effects with regard to solubility seem also to be the foundation of our choice between *fat* and *lean*, *young* and *old meats*. In the *lean* although perhaps a single fibre might be sufficiently tender, yet these, when collected in *fasciculi*, are very firm and compact, and of difficult solution; whereas in the *fat* there is a greater number of vessels, a greater quantity of juice, more interposition of cellular substance, and consequently more solubility. Again, in young animals, there is probably the same number of fibres as in the older, but these more connected: whereas, in the older, the growth depending on the separation of these, and the increase of vessels and cellular substance, the texture is less firm and more soluble; which qualities, with regard to the stomach, are at that time too increased, by the increased alkalescency of the animal. To this also may be referred our choice of castrated animals, *viz.* on account of their disposition to fatten after the operation.

3. It is with a view to the solubility, that we make a choice between meats recently killed, and those which have been kept for some time. As soon as meat is killed, the putrefactive process begins; which commonly we allow to proceed for a little, as that process is the most effectual breaker down of animal matters, and a great assistance to solution. The length of time during which meat ought to be kept, is proportioned to the meat's tendency to undergo the putrid fermentation, and the degree of those circumstances which favour it: Thus, in the torrid zone, where meat cannot be kept above four or five hours, it is used much more recent than in the northern climates.

4. *Boiled* or *roasted* meats create a difference of solution. By boiling we extract the juices interposed between the fibres, approximate them more to each other, and render them of more difficult solubility; which is increased too by the extraction of the juices, which are much more alkalescent than the fibres: but when we want to avoid the stimulus of alkalescent food, and the quick solution, as in some cases of disease, the roasted is not to be chosen. Of roasted meat it may be asked, which are more proper, those which are most or least roasted? That which is least done is certainly the most soluble: even raw meats are more soluble than dressed, as Dr Cullen was informed by a person who from necessity was obliged, for some time, to eat such. But at the same time that meats little done are very soluble, they are very alkalescent; so that, wherever we want to avoid alkalescency in the *primæ viæ*, the most roasted meats should be chosen. Those who throw away the broths of boiled meat do very improperly; for, besides their supplying a fluid from their greater alkalescency they increase the solubility of the meat. Here we shall observe, that pure blood has been thought insoluble. Undoubtedly it is very nutritious; and though out of the body, like the white of eggs, it seems very insoluble, yet, like that too, in the body it is commonly easily digested. Moses very properly forbade it the Israelites, as in warm countries it is highly alkalescent; and even in Britain when it was used in great quantity, the scurvy was

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* See the article Bread.

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more frequent : but to a moderate use of it, in these climates, no such objection takes place.

5. Solubility is varied from another source, *viz.* viscosity of the juice of aliment. Young animals, then, appear more soluble than old, not only on account of the compaction and firmness of texture in the latter, but also their greater viscosity of juice. And nothing is more common, than to be longer oppressed from a full meal of veal, than from the same quantity of beef, &c. Upon account, too, of their greater viscosity of juice, are the tendons and ligamentous parts of animals longer retained than the purely muscular, as well as on account of their firmness of texture. Even fishes, whose muscular parts are exceedingly tender, are, on account of their gluey viscosity, longer of solution in the stomach. And eggs, too, which are exceedingly nourishing, have the same effect, and cannot be taken in great quantity : For the stomach is peculiarly sensible to gelatinous substances ; and by this means has nature perhaps taught us, as it were by a sort of instinct, to limit ourselves in the quantity of such nutritive substances.

6. With regard to solution, we must take in the oils of animal-food ; which, when tolerably pure, are the least putrescent part of it, and, by diminishing the cohesion of the fibres, render them more soluble. On this last account is the lean of fat meat more easily dissolved than other lean. But when the meat is exposed to much heat, this oil is separated, leaving the solid parts less easily soluble, and becoming itself empyreumatic, rancid, and of difficult mixture in the stomach. Fried meats, from the reasons now given, and baked meats, for the same, as well as for the tenacity of the paste, are preparations which diminish the solubility of food. From what has been said, the preparation of food by fattening it, and keeping it for some time after killed, although it may administer to gluttony, will yet, it must be confessed, increase the solution of the food.

II. The second difference of animal-food is with regard to ALKALESCENCY.

Of this we have taken a little notice already under the head of *Solubility*.

1. From their too great alkalescency we commonly avoid the carnivorous animals, and the *feræ*; and choose rather the granivorous. Some birds, indeed, which live on insects, are admitted into our food ; but no man, without *nausea*, can live upon these alone for any length of time. Fishes, too, are an exception to this rule, living almost universally on each other. But in these the alkalescency does not proceed so far ; whether from the viscosity of their juice, their want of heat, or some peculiarity in their economy, is not easy to determine.

2. Alkalescency is determined by difference of age. The older animals are always more alkalescent than the young, from their continual progress to putrefaction. Homberg always found, in his endeavours to extract an acid from human blood, that more was obtained from the young than from the old animals.

3. A third circumstance which varies the alkalescency of the food, is the wildness or tameness of the animal ; and this again seems to depend on its exercise. Dr Cullen knew a gentleman who was fond of cats for food : but he always used to feed them on vegetable

food, and kept them from exercise ; and in the same manner did the Romans rear up their rats, when intended for food. In the same way the flesh of the partridge and the hen seems to be much the same ; only, from its being more on the wing, the one is more alkalescent than the other. Again, tame animals are commonly used without their blood ; whereas the wild are commonly killed in their blood, and upon that account, as well as their greater exercise, are more alkalescent.

4. The alkalescency of food may be determined from the quantity of volatile salt it affords. The older the meat is, it is found to give the greater proportion of volatile salt.

5. The alkalescency of aliment may also, in some measure, be determined from its colour, the younger animals being whiter and less alkalescent. We also take a mark from the colour of the gravy poured out, according to the redness of the juices judging of the animal's alkalescency.

6. The relish of food is found to depend much on its alkalescency, as does also the stimulus it gives and the fever it produces in the system. These effects are also complicated with the viscosity of the food, by which means it is longer detained in the stomach, and the want of alkalescency supplied.

Having mentioned animal food as differing in solubility and alkalescency, which often go together in the same subject, we come to the third difference, *viz.*

III. QUANTITY of Nutriment. Which is either absolute or relative : absolute with respect to the quantity it really contains, sufficient powers being given to extract it ; relative, with respect to the assimilatory powers of those who use it. The absolute nutriment is of some consequence ; but the relative, in the robust and healthy, and except in cases of extraordinary weakness, may, without much inconvenience, be disregarded. In another case is the quantity of nourishment relative, *viz.* with regard to its *perspirability* ; for if the food is soon carried off by the excretions, it is the same thing as if it contained a less proportion of nourishment. For, giving more fluid, that which is longer retained affords most ; and, for the repair of the solids, that retention also is of advantage. Now, gelatinous substances are long retained ; and besides, are themselves animal substances dissolved : so that, both absolutely and relatively, such substances are nutritious. Of this kind are eggs, shell-fish, &c. In adults, though it is disputed whether their solids need any repair, yet, at any rate, at this period, fluid is more required ; for this purpose the alkalescent foods are most proper, being most easily dissolved. They are, at the same time, the most perspirable ; on one hand that alkalescency leading to disease, while on the other their perspirability obviates it. Adults, therefore, as writers justly observe, are better nourished on the alkalescent ; the young and growing, on gelatinous foods. All this leads to a comparison of young and old meats ; the first being more gelatinous, and the last more alkalescent. This, however, by experience, is not yet properly ascertained. Mr Geoffroy is the only person who has been taken up with the analysis of foods. See *Memoirs de l'Academie*, l'an. 1731 &c 1732. His attempt was certainly laudable, and in some respects usefully performed ; but, in general, his experi-

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ments were not sufficiently repeated, nor are indeed sufficiently accurate. He has not been on his guard against the various circumstances which affect meats; the cow kinds liking a moist succulent herbage, which is not to be got in warm climates; while the sheep are fond of a dry food, and thrive best there. Again, some of his experiments seem contradictory. He says, that veal gives more solution than beef, while lamb gives less than mutton; which is much to be doubted. If both he and Sanctorius had examined English beef, the result probably would have been very different as to its perspirability, &c. Besides, Mr Geoffroy has only analysed beef and veal when raw; has made no proper circumstantial comparisons between quadrupeds and birds; and has examined these last along with their bones, and not their muscles, &c. by themselves, as he ought to have done, &c. If a set of experiments of this kind were properly and accurately performed, they might be of great use; but at present, for the purpose of determining our present subject we must have recourse to our alkalescency, solubility, &c.

IV. The fourth difference of animal foods is, *The NATURE of the FLUIDS they afford*. The whole of this will be understood from what has been said on alkalescency; the fluid produced being more or less dense and stimulating, in proportion as that prevails.

V. The fifth difference of animal-foods is with respect to their

PERSPIRABILITY. The sum of what can be said on this matter is this, that such foods as promote an accumulation of fluid in our vessels, and dispose to plethora, are the least perspirable, and commonly give most strength; that the more alkalescent foods are the most perspirable, though the viscid and less alkalescent may attain the same property by long retention in the system. The authors on perspirability have determined the perspiration of foods as imperfectly as Mr Geoffroy has done the solubility, and in a few cases only. We must not lay hold on what Sanctorius has said on the perspirability of mutton, because he has not examined in the very same way other meats in their perfect state; far less on what Keil says of oysters, as he himself was a valetudinarian, and consequently an unfit subject for such experiments, and probably of a peculiar temperament.

As to the effects of FOOD on the MIND, we have already hinted at them above. It is plain, that delicacy of feeling, liveliness of imagination, quickness of apprehension, and acuteness of judgment, more frequently accompany a weak state of the body. True it is indeed, that the same state is liable to timidity, fluctuation, and doubt; while the strong have that steadiness of judgment, and firmness of purpose, which are proper for the higher and more active scenes of life. The most valuable state of the mind, however, appears to reside in somewhat less firmness and vigour of body. Vegetable aliment, as never over distending the vessels or loading the system, never interrupts the stronger motions of the mind; while the heat, fulness and weight, of animal food, are an enemy to its vigorous efforts. Temperance, then, does not so much consist in the quantity, for that always will be regulated by our appetite, as in the quality, viz. a large proportion of vegetable aliment.

A considerable change has now taken place in the

articles made use of as food by the ancients, by substituting, instead of what were then used, particularly of the vegetable kind, a number of more bland, agreeable, and nutritive juices. The acorns and nuts of the primitive times have given way to a variety of sweeter farinaceous seeds and roots. To the malvaceous tribe of plants so much used by the Greeks and Romans, hath succeeded the more grateful spinach; and to the blite, the garden orach. The rough borage is supplanted by the acescent sorrel; and asparagus has banished a number of roots recorded by the Roman writers under the name of *bulbs*; but Linnæus is of opinion, that the parsnip has undeservedly usurped the place of the skirret. The bean of the ancients, improperly so called, being the roots as well as other parts of the *nymphaea nelumbo* or Indian water-lily, is superseded by the kidney-bean. The garden rocket, eaten with and as an antidote against the chilling qualities of the lettuce, is banished by the more agreeable cress and tarragon; the apium by the meliorated celery; the pompon, and others of the cucurbitaceous tribe, by the melon; and the sumach berries, by the fragrant nutmeg. The silphium, or succus Cyrenæicus, which the Romans purchased from Persia and India, at a great price, and is thought by some to have been the asafetida of the present time, is no longer used in preference to the alliaceous tribe.

To turn from the vegetable to some of the animal substitutes, we may mention the carp among fishes as having excluded a great number held in high estimation among the Romans. The change oil for butter; or honey for sugar; of mulla, or liquors made of wine, water, and honey, for the wines of modern times, and that of the ancient zythus for the present improved malt liquors; not to mention also the *callida* of the Roman taverns; analagous to our tea and coffee.

Food of plants. See AGRICULTURE, n° 1—6. and PLANTS; also the article COMPOSTS.

FOOL, according to Mr Locke, is a person who makes false conclusions from right principles; whereas a madman, on the contrary, draws right conclusions from wrong principles. See FOLLY.

Fool-stones, in botany. See ORCHIS.

FOOSHT, an island in the Red Sea; situated according to the observations of Mr Bruce, in N. Lat. 15° 59' 43". It is described by him as above four miles in length from north to south, though only nine in circumference. It is low and sandy in the southern part, but the north rises in a black hill of inconsiderable height. It is covered with a kind of bent-grass, which never arrives at any great length by reason of want of rain and the constant browsing of the goats. There are great appearances of the black hill having once been a volcano; and near the north cape the ground sounds hollow like the Solfaterra in Italy. There are a vast number of beautiful fish met with upon the coasts, but few fit for eating; and our traveller observed, that the most beautiful were the most noxious when eaten; none, indeed, being salutary food excepting those which resembles the fish of the northern seas. There are many beautiful shell-fish, as the coucha veneris, of several colours and sizes; sea-urchins, &c. Sponges are likewise found all along the coast. There are also pearls, but neither large nor of a good water; in consequence of which they sell at no great price. They are produced by a species of bivalve shells. Several

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veral large shells, from the fish named *biffer*, are met with upon stones of ten or twelve tons weight along the coast. They are turned upon their faces and sunk into the stones, as in a paste, the stone being raised all about them in such a manner as to cover the edge of the shell; "a proof (says Mr Bruce) that this stone must some time lately have been soft or liquefied: for had it been long ago, the sun and air would have worn the surface of the shell; but it seems perfectly entire, and is set in that hard brown rock as the stone of a ring is in a golden chafing."—The water in this island is very good.

The inhabitants of Fooht are poor fishermen of a swarthy colour; going naked, excepting only a rag about their waist. They have no bread but what they procure in exchange for the fish they catch. What they barter in this manner is called *seajan*. But besides this they catch another species, which is flat, with a long tail, and the skin made use of for shagreen, of which the handles of knives and swords are made. There is a small town on the island, consisting of about 30 huts, built with faggots of bent grass or spartum, supported by a few sticks, and thatched with grass of the same kind of which they are built.

FOOT, a part of the body of most animals whereon they stand, walk, &c. See ANATOMY. n^o 63.

Foot in the Latin and Greek poetry, a metre or measure, composed of a certain number of long and short syllables.

These feet are commonly reckoned 28: of which some are simple, as consisting of two or three syllables, and therefore called *disyllabic* or *trisyllabic* feet; others are compound, consisting of four syllables, and are therefore called *tetrasyllabic* feet.

The disyllabic feet are four in number, *viz.* the pyrrhichius, spondeus, iambus, and trocheus. See PYRRHICHIVS, &c.

The trisyllabic feet are eight in number, *viz.* the dactylus, anapæstus, tribrachys, molossus, amphibrachys, amphimacer, bacchius, and antibacchius. See DACTYL, &c.

The tetrasyllabic are in number 16, *viz.* the procleusmaticus, dispondeus, choriambus, antispastus, diiambus, dichoreus, ionicus a majore, ionicus a minore, epitritus primus, epitritus secundus, epitritus tertius, epitritus quartus, pæon primus, pæon secundus, pæon tertius, and pæon quartus. See PROCLEUSMATICUS, &c.

Foot is also a long measure consisting of 12 inches.

Geometricians divide the foot into 10 digits and the digit into 10 lines.

Foot-Halt, the name of a particular disorder incident to sheep. It takes its source from an insect, which when it comes to a certain maturity, resembles a worm of two, three, or four inches in length. The first appearance of the malady is, when the sheep gives signs of being lame, which increases to so high a degree as to prevent grazing; when, what with want of sufficient food and pain, the poor animal suffers greatly, and lingers till it dies a natural death, if not properly attended to by extracting the insect or worm; the sooner the better as it is very easily performed.

As soon as the lameness is perceived, let the foot that is lame be examined between the clove of the

claws, and it will be found that in the skin where the clove separates is a small hole (not natural), through which the insect, when yet small, gets its entrance, and by degrees has worked itself upwards along the leg, between the outward skin and bone, and obtains its largest magnitude. Proportionally it finds its nourishment, and is left undisturbed. This worm must be extracted by moving the claws backward and forward in contrary directions; and it will not be long before the under part of the worm makes its appearance at the abovementioned small hole, and continuing the same operation of moving the claws, the whole worm will work itself out; which is better than when at its first appearance it should be drawn out with danger of breaking off, and part of it should remain in the sheep's leg, and by its rotting there may be hurtful. This easy and simple operation will be found effectual without any other kind of application whatever, nature herself curing the channel which the worm had made along the leg.

It is observed, this malady is in some years more prevalent than in others, particularly in wet seasons than in drier; more observed to begin in spring and autumn than in summer and winter; notwithstanding what with snow, &c. sheep suffer more by the wet in winter than in any of the other seasons (possibly it is not then the season for this sort of insect). In high healthy grounds, the sheep are less liable to it than in low marshy and meadow grounds: from all which circumstances it may be supposed, that this insect in its first state, has for its most natural element either the earth, water, or air; and only gets accidentally between the clove of the claws of the sheep, and finds there what is sufficient for its nourishment and security.

Foot Square, is the same measure both in breadth and length containing 144 square or superficial inches.

Cubic or Solid Foot, is the same measure in all the three dimensions, length, breadth, and depth or thickness, containing 1728 cubic inches.

Foot of a Horse, in the manege, the extremity of the leg, from the coronet to the lower part of the hoof.

Foot-Level, among artificers, an instrument that serves as a foot rule, a square, and a level. See LEVEL, RULE, and SQUARE.

FOOTE (Samuel, Esq), the modern Aristophanes, was born at Truro, in Cornwall; and was descended from a very ancient family. His father was member of parliament for Tiverton, in Devonshire; and enjoyed the post of commissioner of the prize-office and fine-contract. His mother was heiress of the Dinely and Goodere families. In consequence of a fatal misunderstanding between her two brothers, Sir John Dinely Goodere, Bart. and Samuel Goodere, Esq; captain of his majesty's ship the Ruby, which ended in the death of both, a considerable part of the Goodere estate, which was better than 5000 l. *per annum*, descended to Mr Foote.

He was educated at Worcester college, Oxford, which owed its foundation to Sir Thomas Cookes Winford, Bart. a second cousin of our author's. On leaving the university, he commenced student of law in the Temple; but as the dryness of this study did not suit the liveliness of his genius, he soon relinquished it.

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Footc. He married a young lady of a good family and some fortune; but their tempers not agreeing, a perfect harmony did not long subsist between them. He now launched into all the fashionable foibles of the age, gaming not excepted; and in a few years spent his whole fortune. His necessities led him to the stage, and he made his first appearance in the character of Othello. He next performed Fondlewife with much more applause; and this, indeed, was ever after one of his capital parts. He attempted Lord Foppington likewise, but prudently gave it up. But as Mr Foote was never a capital actor in the plays of others, his salary was very unequal to his gay and extravagant turn; and he contracted debts which forced him to take refuge within the verge of the court. On this occasion he relieved his necessities by the following stratagem. Sir Fr—s D—l—l had long been his intimate friend, and had dissipated his fortune by similar extravagance. Lady N—ff—u P—l—t, who was likewise an intimate acquaintance of Foote's, and who was exceeding rich, was fortunately at that time bent upon a matrimonial scheme. Foote strongly recommended to her to consult upon this momentous affair the conjurer in the Old Bailey, whom he represented as a man of surprising skill and penetration. He employed an acquaintance of his own to personate the conjurer; who depicted Sir Fr—s D—l—l at full length; described the time when, the place where, and the dress in which she would see him. The lady was so struck with the coincidence of every circumstance, that she married D—l—l in a few days. For this service Sir Francis settled an annuity upon Foote; and this enabled him once more to emerge from obscurity.

In 1747 he opened the little theatre in the Haymarket, taking upon himself the double character of author and performer; and appeared in a dramatic piece of his own composing, called the *Diversions of the Morning*. This piece consisted of nothing more than the exhibition of several characters well known in real life; whose manner of conversation and expression this author very happily hit off in the diction of his drama, and still more happily represented on the stage, by an exact and most amazing imitation, not only of the manner and tone of voice, but even of the very persons, of those whom he intended to take off. In this performance, a certain physician, Dr L—n, well known for the oddity and singularity of his appearance and conversation, and the celebrated chevalier Taylor, who was at that time in the height of his popularity, were made objects of Foote's ridicule; the latter, indeed, very deservedly; and, in the concluding part of his speech, under the character of a theatrical director, Mr Foote took off, with great humour and accuracy, the several styles of acting of every principal performer on the English stage. This performance at first met with some opposition from the civil magistrates of Westminster, under the sanction of the act of parliament for limiting the number of playhouses, as well as from the jealousy of one of the managers of Drury-lane playhouse; but the author being patronised by many of the principal nobility, and other persons of distinction, this opposition was over-ruled, and having altered the title of his performance, Mr Foote proceeded, without further molestation, to give *Tea in a Morning* to his friends, and represented it through a run of

40 mornings, to crowded and splendid audiences.—The ensuing season he produced another piece of the same kind, which he called *An Auction of Pictures*. In this performance he introduced several new and popular characters; particularly Sir Thomas de Veil, then the acting justice of peace for Westminster, Mr Cock the celebrated auctioneer, and the equally famous orator Henley. This piece also had a very great run.—His *Knights*, which was the produce of the ensuing season, was a performance of somewhat more dramatic regularity: but still, although his plot and characters seemed less immediately personal, it was apparent that he kept some particular real persons strongly in his eye in the performance; and the town took upon themselves to fix them where the resemblance appeared to be the most striking.—Thus Mr Foote continued from time to time to select, for the entertainment of the public, such characters, as well general as individual, as seemed most likely to engage their attention. His dramatic pieces, exclusive of the interlude called *Piety in Pattens*, are as follow: Taste, The Knights, The Author, The Englishman in Paris, The Englishman returned from Paris, The Mayor of Garrat, The Liar, The Patron, The Minor, The Orators, The Commissary, The Devil upon Two Sticks, The Lame Lover, The Maid of Bath, The Nabob, The Cozeners, The Capuchin, The Bankrupt, and an unfinished comedy, called the Slanderer.—All these works are only to be ranked among the *petites piéces* of the theatre. In the execution they are somewhat loose, negligent, and unfinished; the plots are often irregular, and the catastrophes not always conclusive: but, with all these deficiencies, they contain more strength of character, more strokes of keen satire, and more touches of temporary humour, than are to be found in the writings of any other modern dramatist. Even the language spoken by his characters, incorrect as it may sometimes seem, will on a closer examination be found entirely dramatical; as it abounds with those natural minutiae of expression which frequently form the very basis of character, and which render it the truest mirror of the conversation of the times in which he wrote.

In the year 1766, being on a party of pleasure with the late duke of York, lord Mexborough, and Sir Francis Delaval, Mr. Foote had the misfortune to break his leg, by a fall from his horse; in consequence of which, he was compelled to undergo an amputation. This accident so sensibly affected the duke, that he made a point of obtaining for Mr Foote a patent for life: whereby he was allowed to perform, at the little theatre in the Haymarket, from the 15th of May to the 15th of September every year.

He now became a greater favourite of the town than ever: his very laughable pieces, with his more laughable performance, constantly filled his house: and his receipts were some seasons almost incredible. Parsimony was never a vice to be ascribed to Mr Foote; his hospitality and generosity were ever conspicuous; he was visited by the first nobility, and he was sometimes honoured even by royal guests.

The attack made upon his character by one of his domestics, whom he had dismissed for misbehaviour, is too well known to be particularized here. Suffice it to say, he was honourably acquitted of that charge: but it is believed by some, that the shock which he received

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ceived from it accelerated his death; others pretend, that his literary altercation with a certain *then* duchess, or rather her agents, much affected him, and that from that time his health declined. It is probable, however, that his natural volatility of spirits could scarcely fail to support him against all impressions from either of these quarters.

Mr Foote, finding his health decline, entered into an agreement with Mr Colman, for his patent of the theatre; according to which, he was to receive from Mr Colman L.1600 *per annum*, besides a stipulated sum whenever he chose to perform. Mr Foote made his appearance two or three times in some of the most admired characters; but being suddenly affected with a paralytic stroke one night whilst upon the stage, he was compelled to retire. He was advised to bathe; and accordingly repaired to Brightelmstone, where he apparently recovered his former health and spirits, and was what is called the *fiddle of the company* who resorted to that agreeable place of amusement. A few weeks before his death he returned to London; but, by the advice of his physicians, set out with an intention to spend the winter at Paris and in the south of France. He had got no farther than Dover, when he was suddenly attacked by another stroke of the palsy, which in a few hours terminated his existence. He died on the 21st of October 1777, in the 56th year of his age, and was privately interred in the cloisters of Westminster-Abbey.

FOP, probably derived from the *vappa* of Horace, applied in his first satire in his first book to the wild and extravagant Nævius, is used among us to denote a person who cultivates a regard to adventitious ornament and beauty to excess.

FORAMEN, in anatomy, a name given to several apertures or perforations in divers parts of the body; as, 1. The external and internal foramina of the cranium or skull. 2. The foramina in the upper and lower jaw. 3. Foramen lachrymale. 4. Foramen membranæ tympani.

FORAMEN Ovale, an oval aperture or passage through the heart of a foetus, which closes up after birth. It arises from the coronal vein, near the right auricle, and passes directly into the left auricle of the heart, serving for the circulation of the blood in the foetus, till such time as the infant breathes, and the lungs are open; it being generally reckoned one of the temporary parts of the foetus, wherein it differs from an adult; although almost all anatomists, Mr Cheselden excepted, assures us, that the foramen ovale has sometimes been found in adults. See FOETUS.

FORBES (Patrick), bishop of Aberdeen, was born in 1654, when the affairs of the church of Scotland were in much confusion; to the settlement of which he greatly contributed. As chancellor of the university of Aberdeen, he improved that seat of learning by repairing the fabric, augmenting the library, and reviving the professorships. He published a *Commentary on the Revelations*, at London, in 1613; and died in 1635.

FORBES (John), the son of Patrick, but of much more extensive learning than his father, was perhaps excelled by none of his age, which will be allowed by those who read his *Historical and Theological Institutes*. He was bishop of Aberdeen; but was expelled by the

Covenanters, and forced to fly beyond sea. He continued in Holland two years; and, upon his return, lived private on his estate at Corse, until he died in 1648. An edition of all his works was printed in two volumes folio at Amsterdam, in 1703.

FORBES (William), a learned bishop of Edinburgh, born in 1585. His ill-health and the anti-episcopal disposition of the Scots, confined him chiefly to a retired life; but when Charles I. in 1633, founded an episcopal church at Edinburgh, he thought none more worthy to fill the see than Mr Forbes; who, however, died three months after his consecration, in 1634. Though very able and learned, he published nothing; but wrote a treatise to pacify controversies, which was printed at London 24 years after his death.

FORBES (Duncan, Esq. of Culloden), was born in the year 1685. In his early life, he was brought up in a family remarkable for hospitality; which, perhaps, led him afterwards to a freer indulgence in social pleasures. His natural disposition inclined him to the army; but, as he soon discovered a superior genius, by the advice of his friends he applied himself to letters. He directed his studies particularly to the civil law; in which he made a quick progress, and in 1709 was admitted an advocate. From 1722 to 1737, he represented in parliament the boroughs of Inverness, Fortrose, Nairn, and Forres. In 1725, he was made king's advocate; and lord president of the court of session in 1737. In the troubles of 1715 and 1745 he espoused the royal cause; but with so much prudence and moderation did he conduct himself at this delicate conjuncture, that not a whisper was at any time heard to his prejudice. The glory he acquired in advancing the prosperity of his country, and in contributing to re-establish peace and order, was the only reward of his services. He had even impaired, and almost ruined, his private fortune in the cause of the public; but government did not make him the smallest recompence. The minister, with a meanness for which it is difficult to account, desired to have a state of his disbursements. He was so much shocked at the rudeness of this treatment, that he left the minister without making any reply. Throughout the whole course of his life he had a lively sense of religion, without the least taint of superstition; and his charity was extended to every sect and denomination of religionists indiscriminately. He was well versed in the Hebrew language; and wrote, in a flowing and oratorical style, concerning religion natural and revealed, some important discoveries in theology and philosophy, and concerning the sources of incredulity. He died in 1747, in the 62d year of his age; and his works have since been published in two volumes octavo.

FORCE, in philosophy, denotes the cause of the change in the state of a body, when, being at rest, it begins to move, or has a motion which is either not uniform or not direct. While a body remains in the same state, either of rest or of uniform or rectilinear motion, the cause of its remaining in such a state is in the nature of the body, and it cannot be said that any extrinsic force has acted on it. This internal cause or principle is called *inertia*.

Mechanical forces may be reduced to two sorts; one of a body at rest, the other of a body in motion.

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The force of a body at rest, is that which we conceive to be in a body lying still on a table, or hanging by a rope, or supported by a spring, &c. and this is called by the names of *pressure, tension, force, or vis mortua, sollicitatio, conatus movendi, conamen, &c.* To this class also of forces we must refer centripetal and centrifugal forces, though they reside in a body in motion; because these forces are homogeneous to weights, pressures, or tensions of any kind.

The force of a body in motion is a power residing in that body so long as it continues its motion; by means of which it is able to remove obstacles lying in its way; to lessen, destroy, or overcome the force of any other moving body, which meets it in an opposite direction; or to surmount any dead pressure or resistance, as tension, gravity, friction, &c. for some time, but which will be lessened or destroyed by such resistance as lessens or destroys the motion of the body. This is called *moving force, vis motrix*, and by some late writers *vis viva*, to distinguish it from the *vis mortua* spoken of before; and by these appellations, however different, the same thing is understood by all mathematicians; namely, that power of displacing, of withstanding opposite moving forces, or of overcoming any dead resistance, which resides in a moving body, and which, in whole or in part, continues to accompany it, so long as the body moves. See MECHANICS.

We have several curious as well as useful observations in Desagulier's Experimental Philosophy, concerning the comparative forces of men and horses, and the best way of applying them. A horse draws with the greatest advantage when the line of direction is level with his breast; in such a situation, he is able to draw 200lb. eight hours a-day, walking about two miles and an half an hour. And if the same horse is made to draw 240lb. he can work but six hours a-day, and cannot go quite so fast. On a carriage, indeed, where friction alone is to be overcome, a middling horse will draw a 1000lb. But the best way to try a horse's force, is by making him draw up out of a well, over a single pulley or roller; and in such a case, one horse with another, will draw 200lb. as already observed.

Five men are found to be equal in strength to one horse, and can, with as much ease, push round the horizontal beam of a mill, in a walk 40 feet wide; whereas three men will do it in a walk only 19 feet wide.

The worst way of applying the force of a horse, is to make him carry or draw up hill: for if the hill be steep, three men will do more than a horse, each man climbing up faster with a burden of 100lb. weight, than a horse that is loaded with 300lb. a difference which is owing to the position of the parts of the human body being better adapted to climb than those of a horse.

On the other hand, the best way of applying the force of a horse, is an horizontal direction, wherein a man can exert least force: thus a man, weighing 140lb. and drawing a boat along by means of a rope coming over his shoulders, cannot draw above 27lb. or exert above one-seventh part of the force of a horse employed to the same purpose.

The very best and most effectual posture in a man,

is that of rowing; wherein he not only acts with more muscles at once for overcoming the resistance, than in any other position; but as he pulls backwards, the weight of his body assists by way of lever. See Desaguliers, Exp. Phil. vol. i. p. 241. where we have several other observations relative to force acquired by certain positions of the body, from which that author accounts for most feats of strength and activity. See also a *Memoire* on this subject by M. de la Hire, in Mem. Roy. Acad. Sc. 1629; or in Desaguliers, Exp. &c. p. 267, &c. who has published a translation of part of it with remarks.

FORCE, in law, signifies any unlawful violence offered to things or persons, and is divided into simple and compound. *Simple force* is what is so committed, that it has no other crime attending it; as where a person by force enters on another's possession without committing any other unlawful act. *Compound force*, is where some other violence is committed with such an act which of itself alone is criminal; as if one enters by force into another's house, and there kills a person, or ravishes a woman. There is likewise a force implied in law, as in every trespass, rescue, or disseisin, and an actual force with weapons, number of persons, &c.—Any person may lawfully enter a tavern, inn, or victualling-house; so may a landlord his tenant's house to view repairs, &c. But if, in these cases, the person that enters commits any violence or force, the law will intend that he entered for that purpose.

FORCEPS, in surgery, &c. a pair of scissors for cutting off or dividing the fleshy membranous parts of the body, as occasion requires. See SURGERY.

FORCIBLE ENTRY, is a violent and actual entry into houses or lands; and a forcible detainer, is where one by violence with-holds the possession of lands, &c. so that the person who has a right of entry is barred, or hindered, therefrom.

At common law, any person that had a right to enter into lands, &c. might retain possession of it by force. But this liberty being abused, to the breach of the peace, it was therefore found necessary that the same should be restrained: Though at this day, he who is wrongfully dispossessed of goods may by force retake them. By statute, no persons shall make an entry on any lands or tenements, except where it is given by law, and in a peaceable manner, even tho' they have title of entry, on pain of imprisonment: and where a forcible entry is committed, justices of peace are authorized to view the place, and enquire of the force by a jury, summoned by the sheriff of the county; and they may cause the tenements, &c. to be restored, and imprison the offenders till they pay a fine. Likewise a writ of forcible entry lies, where a person seized of freehold, is by force put out thereof.

FORCIBLE Marriage, of a woman of estate, is felony. For by the statute 3 H. 7. c. 2. it is enacted, "That if any persons shall take away any woman having lands or goods, or that is heir-apparent to her ancestor, by force, and against her will, and marry or defile her; the takers, procurers, abettors, and receivers, of the woman taken away against her will, and knowing the same, shall be deemed principal felons; but as to procurers, and accessories, they are, before the offence be committed, to be excluded the benefit of clergy, by

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39 Eliz. c. 9. The indictment on the statute 3 H. 7. is expressly to set forth, that the woman taken away had lands or goods, or was heir apparent; and also that she was married or defiled, because no other case is within the statute; and it ought to allege that the taking was for lucre. It is no excuse that the woman at first was taken away with her consent: for if she afterwards refuse to continue with the offender, and be forced against her will, she may from that time properly be said to be taken against her will; and it is not material whether a woman so taken away be at last married or defiled with her own consent or not, if she were under force at the time; the offender being in both cases equally within the words of the act.

Those persons who, after the fact, receive the offender, are but accessories after the offence, according to the rules of common law; and those that are only privy to the damage, but not parties to the forcible taking away, are not within the act, H. P. C. 119. A man may be indicted for taking away a woman by force in another country; for the continuing of the force in any country, amounts to a forcible taking there. *Ibid.* Taking away any woman-child under the age of 16 years and unmarried, out of the custody and without the consent of the father or guardian, &c. the offender shall suffer fine and imprisonment; and if the woman agrees to any contract of matrimony with such person, she shall forfeit her estate during life, to the next of kin to whom the inheritance should descend, &c. Stat. 4 & 5. P. & M. c. 8. This is a force against the parents; and an information will lie for seducing a young man or woman from their parents, against their consents, in order to marry them, &c. See MARRIAGE.

FORCING, in gardening, a method of producing ripe fruits from trees before their natural season. The method of doing it is this: A wall should be erected ten feet high: a border must be marked out on the south side of it, of about four feet wide, and some stakes must be fastened into the ground all along the edge of the border; these should be four inches thick. They are intended to rest the glass lights upon, which are to slope backwards to the wall, to shelter the fruit as there shall be occasion; and there must be, at each end, a door to open either way, according as the wind blows. The frame should be made moveable along the wall, that when a tree has been forced one year, the frame may be removed to another, and so on, that the trees may each of them be forced only once in three years, at which rate they will last a long time. They must be always well-grown trees that are chosen for forcing; for young ones are soon destroyed, and the fruit that is produced from them is never so well tasted. The fruits most proper for this management are the avant or small white nutmeg, the albemarle, the early newington, and the brown nutmeg peaches; Mr Fairchild's early, and the elrugo and newington nectarines; the masculine apricot, and the may-duke and may cherry. For grapes, the white and black sweet-water are the properest; and of gooseberries the Dutch white, the Dutch early green, and the walnut gooseberry; and the large Dutch white and large Dutch red currants.

The dang, before it is put to the wall, should be laid together in a heap for five or six days, that it may

heat uniformly through; and when thus prepared it must be laid four feet thick at the base of the wall, and go sloping up till it is two feet thick at the top. It must be laid at least within three or four inches of the top of the wall; and when it sinks, as it will sink two or three feet, more dung must be laid on; for the first heat will do little more than just swell the blossom-buds. The covering the trees with glasses is of great service; but they should be taken off to admit the benefit of gentle showers to the trees, and the doors at the ends should be either left entirely open, or one or both of them opened, and a mat hung before them, at once to let the air circulate and keep off the frosts.

The dung is never to be applied till towards the end of November; and three changes of it will be sufficient to ripen the cherries, which will be very fine in February. As to the apricots, grapes, nectarines, peaches, and plums, if the weather be milder, the glasses are to be opened to let in sunshine or gentle showers.

If a row or two of scarlet strawberries be planted at the back of the frame, they will ripen in February or the beginning of March; the vines will blossom in April, and the grapes will be ripe in June.

It should be carefully observed, not to place early and late ripening fruits together, because the heat necessary to force the late ones will be of great injury to the early ones after they have fruited.

The masculine apricot will be ripe in the beginning of April, the early nectarines will be ripe about the same time, and the forward sort of plums by the latter end of that month. Gooseberries will have fruit fit for tarts in January or February, and will ripen in March; and currants will have ripe fruit in April.

The trees need not be planted so distant at these walls as at others, for they do not shoot so freely as in the open air; nine feet asunder is sufficient. They should be pruned about three weeks before the heat is applied.

FORCING, in the wine trade, a term used by the wine-coopers for the fining down wines, and rendering them fit for immediate draught. The principal inconvenience of the common way of fining down the white-wines by isinglass, and the red by whites of eggs, is the slowness of the operation; these ingredients not performing their office in less than a week, or sometimes a fortnight, according as the weather proves favourable, cloudy or clear, windy or calm: this appears to be matter of constant observation. But the wine-merchant frequently requires a method that shall, with certainty, make the wines fit for tasting in a few hours. A method of this kind there is, but it is kept in a few hands a valuable secret. Perhaps it depends upon a prudent use of a tartarized spirit of wine, and the common forcing, as occasion is, along with gypsum, as the principal; all which are to be well stirred about in wine, for half an hour before it is suffered to rest.

FORDOUN (John of), the father of Scottish history, flourished in the reign of Alexander III. towards the end of the 13th century. But of his life there is nothing known with certainty, though there was not a monastery that possessed not copies of his work. The first five books of the history which bears

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Fordwich his name were written by him: the rest were fabricated from materials left by him, and from new collections by different persons. A manuscript of vellum of this historian is in the library of the university of Edinburgh.

FORDWICH, a town of Kent, called in the Doomsday-Book "the little Borough of Fordwich," is a member of the port of Sandwich, and was anciently incorporated by the style of the Barons of the town of Fordwich, but more lately by the means of the mayor, jurats, and commonalty, who enjoy the same privileges as the cinque-ports. This place is famous for excellent trouts in its river Stour.

FORDYCE (David), an elegant and learned writer of the present age, was professor of philosophy in the Marischal-college, Aberdeen. He was originally designed for the ministry; to prepare himself for which was the whole aim of his ambition, and for a course of years the whole purpose of his studies. How well he was qualified to appear in that character, appears from his "Theodorus, a dialogue concerning the art of preaching." After having finished this work, he went abroad on his travels, in order to obtain fresh stores of knowledge; but after a successful tour through several parts of Europe, he was unfortunately cast away in a storm on the coast of Holland. Besides the above work, he wrote Dialogues on Education, 8vo, and a Treatise of Moral Philosophy published in the Preceptor. The third edition of his Theodorus was published in London, after his untimely death, by his brother the Rev. Mr James Fordyce, an eminent dissenting minister, in 1755.

FORE, applied to a ship, denotes all that part of a ship's frame and machinery which lies near the stem.

FORE and aft is used for the whole ship's length, or from end to end.

FORECASTLE of a SHIP, that part where the fore mast stands. It is divided from the rest by a bulk-head.

FOREIGN, something extraneous, or that comes from abroad. The word is formed from the Latin *fores*, "doors;" or *foris*, "out of doors;" or *forum*, "market," &c.

Foreign minister, foreign prince, foreign goods, &c. are those belonging to other nations. See MINISTER, &c.

Foreign to the purpose, signifies a thing remote or impertinent.

FOREIGN, in the English law, is used in various significations. Thus,

FOREIGN Attachment, is an attachment of the goods of foreigners found within a city or liberty, for the satisfaction of some citizens to whom the foreigner is indebted; or it signifies an attachment of a foreigner's money in the hands of another person.

FOREIGN Kingdom, a kingdom under the dominion of a foreign prince.

At the instance of an ambassador or consul, any offender against the laws may be sent for from a foreign kingdom to which he hath fled. And, where a stranger of Holland, or any foreign country, buys goods at London, for instance, and there gives a note under his hand for payment, and then goes away privately into Holland; in that case, the seller may have a certificate from the lord mayor, on the

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proof of the sale and delivery of such goods, whereupon a process will be executed on the party in Holland.

FOREIGN Opposer, or Apposer, an officer in the English exchequer that opposes or makes a charge on all sheriffs, &c. of their green wax; that is to say, fines, issues, amerciaments, recognizances, &c.

FOREIGN Plea, signifies an objection to the judge of the court, by refusing him as incompetent, because the matter in question is not within his jurisdiction.

FOREIGN Seamen, serving two years on board British ships, whether of war, trade, or privateers, during the time of war shall be deemed natural-born subjects.

FOREIGNER, the natural-born subject to some foreign prince.

Foreigners, in Britain, though made denizens, or naturalized, are disabled to bear any office of government, to be of the privy counsel, or members of parliament, &c. This is by the acts of the settlement of the crown. Such persons as are not freemen of a city or corporation, are also called *foreigners*, to distinguish them from the members of the same.

FOREJUDGER, in English law, signifies a judgment whereby one is deprived or put by a thing in question.

To be *forejudged the court*, is where an officer or attorney of any court is expelled the same for malpractice, or for not appearing to an action on a bill filed against him, &c. And where an attorney of the common-pleas is sued, the plaintiff's attorney delivers the bill to one of the criers of the court, who calls the attorney defendant, and solemnly proclaims aloud, that if he does not appear thereto, he will be forejudged: likewise a rule is given by the secondary for his appearance; and if the attorney appears not in four days, then the clerk of the warrants strikes such an attorney off the roll of attorneys; after which he becomes liable to be arrested like any other person; but where an attorney is forejudged, he may be restored on clearing himself from his contumacy, and making satisfaction to the plaintiff, &c.

FORELAND, or FORENESS, in navigation, a point of land jutting out into the sea.

North FORELAND, in the isle of Thanet, Kent, of which it is the N. E. point is the promontory ascertained by act of parliament to be the most southern part of the port of London, which is thereby extended N. in a right line to the point called the Nase on the coast of Essex, and forms that properly called the Mouth of the Thames. A sea mark was erected here by the Trinity-House corporation at the public expence which is a round brick-tower near 80 feet high. The sea gains so much upon the land here by the winds at S. W. that within the memory of some that are living above 30 acres of land have been lost in one place. All vessels that pass on the south-side of this head land are said to enter the Channel, which is the name for the narrow sea between England and France: and all the towns and harbours between London and this place, whether on the Kentish or Essex shore, are called members of the port of London.

South FORELAND, in Kent, a head of land forming the east point of the Kentish shore: and called *South*, in respect to its bearing from the other Foreland, which is about six miles to the north. Its situation

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is of great security to the Downs, the road between both, which would be a very dangerous road for ships, did not this point break the sea off, that would otherwise come rolling up from the west to the Flats or bank of sands, which for three leagues together and at about a league or a league and a half from the shore run parallel with it and are dry at low water: so that those two capes breaking all the force of the sea on the S. E. and S. W. make the Downs accounted a good road, except when the wind blows excessive hard from S. E. E. by N. or E. N. E. when ships in the Downs are driven from their anchors, and often run a-shore, or are forced on the sands, or into Sandwich bay or Ramsgate pier.

FORE-ROCKS, in the sea-language, little flat wedges made with iron, used at the ends of bolts, to keep them from flying out of their holes.

FORE-MAST of a SHIP, a large round piece of timber, placed in the fore-part or fore-castle, and carrying the fore-sail and fore-top-sail yards. Its length is usually $\frac{3}{4}$ of the main-mast, and the fore-top-gallant-mast is $\frac{1}{2}$ the length of the fore-top.

FOREMAST-Men, are those on board a ship that take in the top sails, sling the yards, furl the sails, bowse, trice, and take their turn at the helm, &c.

FOREST, in geography, a huge wood: or, a large extent of ground covered with trees. The word is formed of the Latin *foresta*, which first occurs in the capitulars of Charlemagne, and which itself is derived from the German *frost*, signifying the same thing. Spelman derives it from the Latin *foris restat*, by reason forests are out of towns. Others derive *foresta* from *feris*, q. d. *Foresta, quoad sit tuta statio ferarum*, as being a safe station or abode for wild beasts.

The Caledonian and Hercynian forests are famous in history. The first was a celebrated retreat of the ancient Picts and Scots; the latter anciently occupied the greatest part of Europe; particularly Germany, Poland, Hungary, &c. In Cæsar's time it extended from the borders of Alsatia and Switzerland to Transylvania; and was computed 60 days journey long and 9 broad: some parts or cantons thereof are still remaining.

The ancients adored forests, and imagined a great part of their gods to reside therein; temples were frequently built in the thickest forests; the gloom and silence whereof naturally inspire sentiments of devotion, and turn mens thoughts within themselves.

For The like reason the Druids made forests the place of their residence, performed their sacrifices, instructed their youth, and gave laws therein.

FOREST, in law, is defined, by Manwood, a certain territory of woody grounds and fruitful pastures, privileged for wild beasts and fowls of forest, chase, and warren, to rest and abide under the protection of the king, for his princely delight: bounded with unremoveable marks and meres, either known by matter of record or prescription; replenished with wild beasts of venery or chase, with great coverts of vert for the said beasts; for preservation and continuance whereof, the vert and venison, there are certain particular laws, privileges, and officers.

Forests are of such antiquity in England, that excepting the New-Forest in Hampshire, erected by William the Conqueror, and Hampton Court, erected by

Henry VIII. it is said that there is no record or history which makes any certain mention of their erection, though they are mentioned by several writers and in several laws and statutes. Ancient historians tell us, "that New-forest was raised by the destruction of 22 parish-churches, and many villages, chapels, and manors, for the space of 30 miles together, which was attended with divers judgments on the posterity of William I. who erected it: for William Rufus was there shot with an arrow, and before him Richard the brother of Henry I.; and Henry nephew to Robert, the eldest son of the Conqueror, did hang by the hair of the head in the boughs of the forest, like unto Absalom." *Blount*.

Besides the New-forest, there are 68 other forests in England, 13 chases, and more than 700 parks; the four principal forests are New-forest on the sea, Shirewood-forest on the Trent, Dean-forest on the Severn, and Windsor-forest on the Thames.

A forest in the hands of a subject is properly the same thing with a CHASE: being subject to the common law, and not to the forest laws. But a chase differs from a forest, in that it is inclosed; and likewise, that a man may have a chase in another man's ground as well as his own; being indeed the liberty of keeping beasts of chase, or royal game therein, protected even from the owner of the land, with a power of hunting them thereon. See **PARK**.

The manner of erecting a forest is thus: Certain commissioners are appointed under the great seal, who view the ground intended for the forest, and fence it round; this commission being returned into chancery, the king causeth it to be proclaimed throughout the county where the land lieth, that it is a forest; and prohibits all persons from hunting there, without his leave. Though the king may erect a forest on his own ground and waste, he may not do it on the ground of other persons without their consent; and agreement with them for that purpose ought to be confirmed by parliament.

A forest directly taken, cannot be in the hands of any but the king: for no person but the king has power to grant a commission to be justice in eyre of the forest: yet if he grants a forest to a subject, and that on request made in the chancery, that subject and his heirs shall have justices of the forest, in which case the subject has a forest in law.

A second property of a forest is, the courts thereof. See **FOREST-Court**, *infra*.

A third property is the officers belonging to it, as the justice, warden, verderer, forester, agistor, regarder, keeper, bailiff, beadle, &c. See the articles **AGISTOR**, **BAILIFF**, **FORESTER**, &c.

By the laws of the forest, the receivers of trespasses in hunting or killing of the deer, if they know them to be the king's property, are principal trespassers. Likewise, if a trespass be committed in a forest, and the trespasser dies, after his death, it may be punished in the life-time of the heir, contrary to common law. The Norman kings punished such as killed deer in any of their forests with great severity; also in various manners; as by hanging, loss of limbs, gelding, and putting out eyes. By *magna charta de foresta*, it is ordained, that no person shall lose life or member for killing the king's deer in forests, but shall be fined; and

Forest.

Forest

if the offender has nothing to pay the fine, he shall be imprisoned a year and a day, and then be delivered, if he can give security not to offend for the future, &c. 9 Hen. III. c. 1.

Before this statute, it was felony to hunt the king's deer; and by a late act, persons armed and disguised, appearing in any forest, &c. if they hunt, kill, or steal any deer, &c. are guilty of felony. 9. Geo. I. c. 22.

He who has any licence to hunt in a forest or chase, &c. is to take care that he does not exceed his authority; otherwise he shall be deemed a trespasser from the beginning, and be punished for the fact, as if he had no licence. See further, the articles GAME, and Game-LAW.

Beasts of the forest are, the hart, hind, buck, doe, boar, wolf, fox, hare, &c. The seasons for hunting whereof are as follow, viz. that of the hart and buck begins at the feast of St John Baptist, and ends at Holy-rood day; of the hind and doe, begins at Holy rood, and continues till Candlemas; of the boar, from Christmas to Candlemas; of the fox begins at Christmas, and continues till Lady-day; of the hare at Michaelmas, and lasts till Candlemas.

FOREST-Courts, courts instituted for the government of the king's forests in different parts of the kingdom, and for the punishment of all injuries done to the king's deer or venison, to the vert or greensward, and to the covert in which such deer are lodged. These are the courts of ATTACHMENTS, of REGARD, of SWEINMOTE, and of JUSTICE-SEAT. 1. The court of attachments, woodmote, or forty-days court, is to be held before the verderors of the forest once in every forty days; and is instituted to inquire into all offenders against vert and venison: who may be attached by their bodies, if taken with the mainour (or *mainœuvre*, à *manu*) that is, in the very act of killing venison, or stealing wood, or in the preparing so to do, or by fresh and immediate pursuit after the act is done; else they must be attached by their goods. And in this forty-days court the foresters or keepers are to bring in the attachments, or presentments *de viridi et venatione*; and the verderors are to receive the same, and to enrol them, and to certify them under their seals to the court of justice-seat or sweinmote: for this court can only enquire of, but not convict, offenders. 2. The court of regard, or survey of dogs, is to be holden every third year for the lawing or expeditation of mastiffs; which is done by cutting off the claws of the fore-feet, to prevent them from running after deer. No other dogs but mastiffs are to be thus lawed or expeditated, for none other are permitted to be kept within the precincts of the forest: it being supposed that the keeping of these, and these only, was necessary for the defence of a man's house. 3. The court of sweinmote is to be holden before the verderors, as judges, by the steward of the sweinmote, thrice in every year; the sweins or freeholders within the forest composing the jury. The principal jurisdiction of this court is, first, to inquire into the oppressions and grievances committed by the officers of the forest; "*de super-oratione forestariorum, et aliorum ministrorum forestæ; et de eorum oppressionibus populo regis illatis*:" and, secondly, to receive and try presentments certified from the court of attachments against offences in vert and venison. And this court may not only inquire, but convict also; which conviction shall be certified to the court of justice-seat un-

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Comment.

der the seals of the jury, for this court cannot proceed to judgement. But the principal court is, 4. The court of justice-seat, which is held before the chief justice in eyre, or chief itinerant judge, *capitalis justitiarius in itinere*, or his deputy: to hear and determine all trespasses within the forest, and all claims of franchises, liberties, and privileges, and all pleas and causes whatsoever therein arising. It may also proceed to try presentments in the inferior courts of the forests, and to give judgment upon conviction of the sweinmote. And the chief justice may therefore, after presentment made or indictment found, but not before, issue his warrant to the officers of the forest to apprehend the offenders. It may be held every third year; and 40 days notice ought to be given of its sitting. This court may fine and imprison for offences within the forest, it being a court of record: and therefore a writ of error lies from hence to the court of king's-bench, to rectify and redress any mal-administration of justice; or the chief justice in eyre may adjourn any matter of law into the court of king's-bench.

FOREST-Laws, are peculiar laws different from the common law of England. Before the making of *Charta de Foresta*, in the time of king John and his son Henry III. confirmed in parliament by 9 Henry III. offences committed therein were punished at the pleasure of the king in the severest manner. By this charter, many forests were disafforested and stripped of their oppressive privileges, and regulations were made for the government of those that remained, particularly, killing the king's deer was made no longer a capital offence, but only punished by fine, imprisonment, or abjuration of the realm: yet even in the charter there were some grievous articles, which the clemency of later princes have since by statute thought fit to alter *per assisas forestæ*. And to this day, in trespasses relating to the forest, *voluntas reputabitur pro facto*; so that if a man be taken hunting a deer, he may be arrested as if he had taken a deer.

FOREST-Towns, in geography, certain towns of Suabia in Germany, lying along the Rhine, and the confines of Switzerland, and subject to the house of Austria. Their names are *Rhinefeld*; *Seckingen*, *Lausenbourg*, and *Waldshut*.

FORE-STAFF, an instrument used at sea for taking the altitudes of heavenly bodies. The fore-staff, called also *cross-staff*, takes its denomination hence, that the observer, in using it, turns his face towards the object; in contradistinction to the back-staff, where he turns his back to the object.

The fore or cross staff, represented in Plate CXCV. consists of a straight square staff, A B, graduated like a line of tangents and four crosses or vanes, F F, E E, D D, C C, which slide thereon. The first and shortest of these vanes, F F, is called the *ten cross*, or *vane*, and belongs to that side of the instrument whereon the divisions begin at three degrees and end at ten. The next longer vane, E E, is called the *thirty cross*, belonging to that side of the staff wherein the divisions begin at ten degrees and end at thirty, called the *thirty scale*. The next vane, D D, is called the *sixty cross*, and belongs to the side where the divisions begin at twenty degrees and end at sixty. The last and longest, C C, called the *ninety cross*, belongs to the side whereon the divisions begin at thirty degrees and end at ninety.

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Fore-staff.

Fore-staff
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The great use of this instrument is to take the height of the sun and stars, or the distance of two stars : and the ten, thirty, sixty, or ninety crosses, are to be used according as the altitude is greater or less ; that is, if the altitude be less than ten degrees, the ten cross is to be used ; if above ten, but less than thirty, the thirty cross is to be used, &c. *Note*, For altitudes greater than thirty degrees, this instrument is not so convenient as a quadrant or semicircle.

To observe an altitude by this instrument.—Apply the flat end of the staff to your eye, and look at the upper end of the cross for the centre of the sun or star, and at the lower end for the horizon. If you see the sky instead of the horizon, slide the cross a little nearer the eye ; and if you see the sea instead of the horizon, slide the cross farther from the eye : and thus continue moving till you see exactly the sun or star's centre by the top of the cross, and the horizon by the bottom thereof. Then the degrees and minutes, cut by the inner edge of the cross upon the side of the staff peculiar to the cross you use, give the altitude of the sun or star.

If it be the meridian altitude you want, continue your observation as long as you find the altitude increase, still moving the cross nearer to the eye. By subtracting the meridian altitude thus found from 90 degrees, you will have the zenith distance. To work accurately, an allowance must be made for the height of the eye above the surface of the sea, viz. for one English foot, 1 minute ; for 5 feet, 2 $\frac{1}{2}$; for 10 feet, 3 $\frac{1}{2}$; for 20 feet, 5 ; for 40 feet, 7, &c. These minutes subtracted from the altitude observed, and added to the zenith distance observed, give the true altitude and zenith distance.

To observe the distance of two stars, or the moon's distance from a star, by the fore-staff.—Apply the instrument to the eye, and looking to both ends of the cross, move it nearer or farther from the eye till you see the two stars, the one on the one end, and the other on the other end, of the cross ; then the degrees and minutes cut by the cross on the side proper to the vane in use give the stars distance.

FORESTALLER, a person who is guilty of forestalling. See the next article.

FORESTALLING, in law, buying or bargaining for any corn, cattle, victuals, or merchandise, in the way as they come to fairs or markets to be sold, before they get thither, with an intent to sell the same again at a higher price.

The punishment in Britain for this offence, upon conviction at the quarter-sessions by two or more witnesses, is, the first time, two months imprisonment and the loss of the goods, or the value ; for the second offence, the offender shall be imprisoned six months, and lose double the value of the goods ; for the third offence, he shall suffer imprisonment during the king's pleasure, forfeit all his goods and chattels, and stand on the pillory : but the statute does not extend to maltsters buying barley, or to badgers licensed.

FORESTER, a sworn officer of the forest, appointed by the king's letters-patent, to walk the forest at all hours, and watch over the vert and venison ; also to make attachments and true presentments of all trespasses committed within the forest.

If a man comes in a forest in the night, a forester cannot lawfully beat him before he makes some resist-

ance ; but in case such a person resists the forester, he may justify a battery. And a forester shall not be questioned for killing a trespasser that, after the peace cried to him, will not surrender himself, if it be not done on any former malice ; though, where trespassers in a forest, &c. do kill a person that opposes them, it is murder in all, because they were engaged in an unlawful act, and therefore malice is implied to the person killed.

FORETHOUGHT-FELONY, in Scots law, signifies premeditated murder. See **MURDER**.

FORFAR, a parliament-town of Scotland, and capital of the county of that name, situated in N. Lat. 56. 25. W. Long. 2. 32. This town, with Dundee, Cupar, Perth, and St Andrew's, jointly send one member to the British parliament. It stands in the great valley of Strathmore that runs from Perth north-east to the sea, almost in a straight line, about 50 miles long and betwixt four and five miles broad, bordered on either side by hills, rising gently on the south side, and on the north by the famous Grampians, a little more elevated.

Though history is silent as to the etymology of the name *Forfar*, yet we are sure it is of very ancient date, and that in the days of old it was the residence of royal majesty. Here Malcom Canmore, a wise and magnanimous prince, held his first parliament in 1057. The ruins of his palace are still to be seen on the top of an artificial mount of a circular form, resting upon a base of about three acres of ground, and rising 50 feet high above the level of the circumambient plain. A wall of stone of a great thickness, so strongly cemented with run-lime that it is scarce possible to break the cement with the stroke of a hammer, environed the place ; and a mote of at least 20 feet broad, and in some parts a great deal more, and 12 feet deep, encompassed the whole. Adjoining to this is a field of about six acres of ground called the *Queen's Manor*, surrounded in those days with a large sheet of water, and accessible only by boats. In clearing away some of the rubbish of the palace a few years ago, a tea-kettle of a conical figure, and a bunch of barbed arrows, were found in the ruins. A pit of about 18 feet deep, very prettily built of hewn stone, with a human body in a state of extreme putrefaction, was also discovered. The lake of Forfar, stretching two miles in length from east to west, and half a mile in breadth, and covering the palace on the north, afforded not only a plentiful supply of water for every purpose, but also added to the strength of the place. This lake abounds with trout, pike, perch, and eel. Of late years it has been greatly reduced by draining ; to which the immense quantity of fine marle at the bottom was the principal inducement. This excellent manure is found here in large strata from two to six and eight feet deep, and generally below moss ten feet deep.

This lake has proved fatal to many of the human race ; but particularly and deservedly so to the murderers of Malcom II. who having fled after perpetrating the bloody deed at the castle of Glamis, about five miles distant, in the year 1036, missed their way, owing to a deep fall of snow, and wandered in the fields for some time, till at last they came upon the ice on the lake, which not being firm, suddenly gave way under them, and they all perished. When the thaw came

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Forfar. came, their bodies were found; and being discovered to be the murderers of the king, they were all hung on gibbets on the sides of the highways.

Within this lake were formerly two islands raised by art, with buildings on each; to which Margaret, Malcom Canmore's queen, retired after the decease of her husband. Part of the ruins of these edifices are still to be seen. To this queen, tradition says, we owe the custom of the grace-drink; she having established it as a rule at her table, that whoever staid till grace was said was rewarded with a bumper.

From this time we have little or no accounts of Forfar till the middle of the 17th century, except an act passed in the 13th parliament of James VI. 21st July 1593, in the following words: "Our soveraine Lorde, understanding that be acte and ordinance maid anent observacion of the Sabbath-daie within this realme, the mercatte-daie of the burgh of Forfare, being the head burgh of the schire, quilk was Sundaie, is taken from them; and his hiennesse not willing that they in onie waies suld be prejudged hereby, therefore his hiennesse, with advice of the estaies of this present parliament, alteris and changis their said mercatte-daie from Sundaie to Fridaie, and willis the samen Friday oukly to be their mercatte-daie to them in all times hereafter; and the samen to stande with the like priviledges and freedoms as the Sundaie did of before." Whether this change took place, or how long it continued, is uncertain; but the market-day is presently held on Saturday, and has been so past memory of man.

During the usurpation of Oliver Cromwell, a detachment of his forces, after sacking Dundee, came to Forfar and burnt all the public records of the place; and the only charter the town now has is one granted by Charles II. after his restoration, confirming all its ancient rights and privileges.

As an evidence of the ignorance and barbarity of the times, it appears from the records of the trials kept in the charter chest of Forfar, that nine persons were condemned and burnt here for witchcraft betwixt the years 1650 and 1662. These innocent people were all tried by a special commission from the lords of the privy-council at Edinburgh; and although the commission expressly discharged torturing them on purpose to extort a confession of their guilt, yet, as it was then thought meritorious to obtain confession of guilt by whatever means, many inhuman cruelties were exercised upon the unfortunate objects, particularly, an iron boot was drawn upon one of their legs, and a wedge driven with great force between it and the leg. Another instrument, still carefully preserved here, was likewise used, and is called the *witch-bridle*. It is made of iron, in the shape of a dog's collar, with two pikes on the inside, about four inches distant, and two and a half long. These pikes were put into the mouth, and the collar afterwards buckled strait on the back of the head, to which was affixed an iron chain, whereby the condemned persons were led to the place of execution called the *Play-Field*, about a quarter of a mile to the northward of the town.

The inhabitants of Forfar are a hospitable, free, and generous set of people: they are at least doubled in number within these 30 years, being now about 3300, the houses have also increased more in proportion, besides being vastly improved. The church here has just

been rebuilt on an elegant and extensive plan calculated to contain 2000 hearers.

FORFAR Shire, a county of Scotland, of which Forfar is the capital. Including Angus, Glenilla, Glenesk, and Glenprasslin, it extends 29 miles from east to west, and 16 where broadest, though in some places the breadth does not exceed five miles. On the north it is divided from the Brae of Mar by a ridge of the Binchin mountains; it is bounded on the south by the Frith of Tay and the British ocean, on the east by Mearns, and on the west by Perthshire. Part of the Grampian mountains runs through this county, which is agreeably diversified with hill and dale. It produces lead and iron in abundance, together with quarries of freestone and slate, with which the inhabitants drive a considerable traffic. The county is well watered with lakes, rivers, rivulets, and fountains, shaded with large forests, roughened with brown mountains, and waved with green hills interspersed with fields and meadows, and adorned with fine seats and plantations. Their heaths and woods abound with hart, hind, roebuck and moor game; their streams are stocked with trout and salmon. Their hills are covered with flocks of sheep, and their fields afford plentiful harvests of wheat, and all sorts of grain. The mountains to the west and north are inhabited by Highlanders: but the Lowlanders possess the towns and champaign country, and are remarkable for their politeness and hospitality.

FORFEITURE, originally signifies a transgression, or offence against some penal law. The word is formed of the base Latin *forisfactura*: whence *forfaitura* and *forfaitura*; and the French *forfait*. *Forisfactura* comes of *forisfacere*; which, according to Isidore, signifies to "hurt or offend," *facere contra rationem*, and which is not improbably derived of *foris* "out," and *facere*, "to do," q. d. an action out of rule, or contrary to the rules. Borel will have *forfait* derived from the using of force or violence: Lobineau in his glossary will have *forisfacta* properly to signify a mulct or amend, not a *forfeit*; which latter he derives from the base British *forfed*, "a penalty."

But, with us, it is more frequently used for the effect of such transgression; or the losing some right, privilege, estate, honour, office, or effects, in consequence thereof; than for the transgression itself.

Forfeiture differs from *confiscation*, in that the former is more general; while confiscation is particularly applied to such things as become forfeited to the king's exchequer; and goods confiscated are said to be such as nobody claims.

Forfeitures may be either in *civil* or *criminal* cases.

I. With respect to the first, a man that hath an estate for life or years, may forfeit it many ways, as well as by treason or felony; such as alienation, claiming a greater estate than he hath, or affirming the reversion to be in a stranger, &c. When a tenant in tail makes leases not warranted by the statute; a copyholder commits waste, refuses to pay his rent, or do suit of court; and where an estate is granted upon condition, on non-performance thereof, &c. they will make a forfeiture.

Entry for a forfeiture ought to be by him who is next in reversion, or remainder, after the estate forfeited. As if tenant for life or years commits a forfeiture, he who has the immediate reversion or remainder ought

Forfar,
Forfeiture.

Forfeiture. ought to enter; though he has the fee, or only an estate-tail.

II. Forfeiture in criminal cases is twofold; of real, and personal estates.

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Comment.*

I. As to real estates, by **ATTAINDER** in high-treason, a man forfeits to the king all his lands and tenements of inheritance, whether fee-simple or fee-tail; and all his rights of entry on lands and tenements, which he had at the time of the offence committed, or at any time afterwards, to be for ever vested in the crown; and also the profits of all lands and tenements, which he had in his own right for life or years, so long as such interest shall subsist. This forfeiture relates backwards to the time of the treason committed; so as to avoid all intermediate sales and incumbrances, but not those before the fact: and therefore a wife's jointure is not forfeitable for the treason of her husband; because settled upon her previous to the treason committed. But her dower is forfeited, by the express provision of Statute 5 and 6 Edw. VI. c. 11. And yet the husband shall be tenant by the curtesy of the wife's lands, if the wife be attainted of treason: for that is not prohibited by the statute. But, though after attainder the forfeiture relates back to the time of the treason committed, yet it does not take effect unless an attainder be had, of which it is one of the fruits; and therefore, if a traitor dies before judgment pronounced, or is killed in open rebellion, or is hanged by martial law, it works no forfeiture of his land: for he never was attainted of treason. But if the chief justice of the king's bench (the supreme coroner of all England) in person, upon the view of the body of him killed in open rebellion, records it and returns the record into his own court, both lands and goods shall be forfeited.

The natural justice of forfeiture or confiscation of property, for treason, is founded on this consideration: That he who hath thus violated the fundamental principles of government, and broken his part of the original contract between king and people, hath abandoned his connections with society, and hath no longer any right to those advantages which before belonged to him purely as a member of the community; among which *social* advantages, the right of transferring or transmitting property to others is one of the chief. Such forfeitures, moreover, whereby his posterity must suffer as well as himself, will help to restrain a man, not only by the sense of his duty, and dread of personal punishment, but also by his passions and natural affections; and will interest every dependant and relation he has to keep him from offending: according to that beautiful sentiment of Cicero, "*nec vero me fugit quam sit acerbum; parentum scelera filiorum pœnis lui: sed hoc præclare legibus comparatum est, ut caritas liberorum amiciores parentes reipublicæ redderet.*" And therefore Aulus Cascellius, a Roman lawyer in the time of the triumvirate, used to boast that he had two reasons for despising the power of the tyrants; his old age and his want of children: for children are pledges to the prince of the father's obedience. Yet many nations have thought, that this posthumous punishment favours of hardship to the innocent; especially for crimes that do not strike at the very root and foundation of society, as treason against the government expressly does. And therefore, although confiscations were very frequent in the times of the earlier emperors, yet Arca-

dus and Honorius, in every other instance but that of Forfeiture. treason, thought it more just, *ibi esse pœnam, ubi et noxa est*; and ordered, that "*peccata suos teneant auctores, nec ulterius progrediatur metus, quam reperiatur delictum:*" and Justinian also made a law to restrain the punishment of relations; which directs the forfeiture to go, except in the case of *crimen majestatis*, to the next of kin to the delinquent. On the other hand, the Macedonian laws extended even the capital punishment of treason, not only to the children, but to all the relations of the delinquent: and of course their estates must be also forfeited, as no man was left to inherit them. And in Germany, by the famous golden bull (copied almost *verbatim* from Justinian's code), the lives of the sons of such as conspire to kill an elector are spared, as it is expressed, by the emperor's *particular bounty*. But they are deprived of all their effects and right of succession, and are rendered incapable of any honour ecclesiastical and civil; to the end that, being always poor and necessitous, they may for ever be accompanied by the infamy of their father; may languish in continual indigence; and may find (says this merciless edict) their punishment in living, and their relief in dying."

In England, forfeiture of lands and tenements to the crown for treason is by no means derived from the feudal policy, but was antecedent to the establishment of that system in that island; being transmitted from their Saxon ancestors, and forming a part of the ancient Scandinavian constitution. But in certain treasons relating to the coin (which seems rather a species of the *crimen falsi* than the *crimen læsæ majestatis*), it is provided by some of the modern statutes which constitute the offence, that it shall work no forfeiture of lands, save only for the life of the offenders; and by all, that it shall not deprive the wife of her dower. And, in order to abolish such hereditary punishment entirely, it was enacted by Statute 7 Ann. c. 21. that, after the decease of the late pretender, no attainder for treason should extend to the disinheriting of any heir, nor to the prejudice of any person, other than the traitor himself. By which the law of forfeitures for high treason would by this time have been at an end, had not a subsequent statute intervened to give them a longer duration. The history of this matter is somewhat singular, and worthy observation. At the time of the union, the crime of treason in Scotland was, by the Scots law, in many respects different from that of treason in England; and particularly in its consequence of forfeitures of entailed estates, which was more particularly English; yet it seemed necessary, that a crime so nearly affecting government should, both in its essence and consequences, be put upon the same footing in both parts of the united kingdoms. In new-modelling these laws, the Scots nation and the English house of commons struggled hard, partly to maintain, and partly to acquire, a total immunity from forfeiture and corruption of blood: which the house of lords as firmly resisted. At length a compromise was agreed to, which is established by this statute, *viz.* that the same crimes, and no other, should be treason in Scotland that are so in England; and that the English forfeitures and corruption of blood should take place in Scotland till the death of the then pretender, and then cease throughout the whole of Great Britain: the lords artfully proposed this temporary clause, in hopes (it

Forfeiture. is said) that the prudence of succeeding parliaments would make it perpetual. This has partly been done by the statute 17 Geo. II. c. 39. (made in the year preceding the late rebellion), the operation of these indemnifying clauses being thereby still farther suspended till the death of the son of the pretender.

In petit treason and felony, the offender also forfeits all his chattel interests absolutely, and the profits of all freehold estates during life; and after his death all his lands and tenements in fee simple (but not those in tail) to the crown, for a very short period of time: for the king shall have them for a year and a day and may commit therein what waste he pleases; which is called the king's year, day and waste. Formerly the king had only a liberty of committing waste on the lands of felons, by pulling down their houses, extirpating their gardens, plowing their meadows, and cutting down their woods. And a punishment of a similar spirit appears to have obtained in the oriental countries from the decrees of Nebuchadnezzar and Cyrus in the books of Daniel and Ezra; which, besides the pain of death inflicted on the delinquents there specified, ordain, "that their houses shall be made a dunghill." But this tending greatly to the prejudice of the public, it was agreed in the reign of Henry I. in England, that the king should have the profits of the land for one year and a day in lieu of the destruction he was otherwise at liberty to commit: and therefore *magna charta*, provides, that the king shall only hold such lands for a year and a day, and then restore them to the lord of the fee, without any mention made of waste. But the statute 17 Edw. II. *de prerogativa regis*, seems to suppose, that the king shall have his year, day, and waste; and not the year and day instead of waste: which Sir Edward Coke (and the author of the *Mirror* before him) very justly look upon as an encroachment, though a very ancient one, of the royal prerogative. The year, day, and waste, are now usually compounded for; but otherwise they regularly belong to the crown; and after their expiration the land would naturally have descended to the heir (as in gavelkind tenure it still does), did not its feudal quality intercept such descent, and give it by way of escheat to the lord. These forfeitures for felony do also arise only upon attainder: and therefore a *felo de se* forfeits no lands of inheritance or freehold, for he never is attainted as a felon. They likewise relate back to the time the offence was committed as well as forfeitures for treason, so as to avoid all intermediate charges and conveyances. This may be hard upon such as have unwarily engaged with the offender: but the cruelty and reproach must lie on the part, not of the law, but of the criminal; who has thus knowingly and dishonestly involved others in his own calamities.

2. The forfeiture of goods and chattels accrues in every one of the high kinds of offence; in high treason, or misprision thereof, petit treason, felonies of all sorts whether clergyable or not, self-murder or felony *de se*, petty larceny, standing mute, &c. For flight also, on an accusation of treason, felony, or even petit larceny, whether the party be found guilty or acquitted, if the jury find the flight, the party shall forfeit his goods and chattels: for the very flight is an offence, carrying with it a strong presumption of guilt, and is at least an endeavour to elude and stifle the

course of justice prescribed by the law. But the jury very seldom find the flight; forfeiture being looked upon, since the vast increase of personal property of late years, as too large a penalty for an offence to which a man is prompted by the natural love of liberty.

There is a remarkable difference or two between the forfeiture of lands and of goods and chattels. (1.) Lands are forfeited upon *attainder*, and not before: goods and chattels are forfeited by *conviction*. Because in many of the cases where goods are forfeited, there never is any attainder; which happens only where judgment of death or outlawry is given; therefore, in those cases the forfeiture must be upon conviction, or not at all; and being necessarily upon conviction in these, it is so ordered in all other cases, for the law loves uniformity. (2.) The forfeiture of lands has relation to the time the fact was committed, so as to avoid all subsequent sales and incumbrances; but the forfeiture of goods and chattels has no relation backwards; so that those only which a man has at the time of conviction shall be forfeited. Therefore a traitor or felon may *bona fide* sell any of his chattels, real or personal, for the sustenance of himself and family between the fact and conviction: for personal property is of so fluctuating a nature, that it passes through many hands in a short time: and no buyer could be safe, if he were liable to return the goods which he had fairly bought, provided any of the prior vendors had committed a treason or felony. Yet if they be collusively and not *bona fide* parted with, merely to defraud the crown, the law (and particularly the statute 13 Eliz. c. 5.) will reach them; for they are all the while truly and substantially the goods of the offender: and as he, if acquitted, might recover them himself, as not parted with for a good consideration; so, in case he happens to be convicted, the law will recover them for the king.

FORFEX, in Roman antiquity, was a way of drawing up an army in the form of a pair of sheers. It was intended to receive the *cuneus* or wedge, if the enemy should make use of that figure. For when the *forfex* opened to admit the wedge, they had an opportunity of defeating their design, and cutting them in pieces.

FORFICULA, the EAR-WIG, in zoology, a genus of insects belonging to the order of coleoptera. The antennæ are bristly; the elytra are dimidiated; the wings are covered; and the tail is forked. There are two species, *viz.* the auricularia, or common ear-wig, with the tops of the elytra white; and the minor, with testaceous and unspotted elytra.—This genus of insects is one of the best known, the forceps at the extremity of their abdomen forming a very distinctive character. It is this seeming weapon that has occasioned those insects to be called *forficulae* in Latin: and the formidable name of *ear-wigs* has been given them in English, from a notion that the insect frequently introduces itself into the ears, causing great pain and even death. Mr Barbut, however, assures us, that the forceps which the ear-wig carries at his tail, and with which he seems provided for his defence, is not so formidable as it at first appears, being destitute of strength sufficient to produce the least sensible impression. The larva of the ear-wig differs very little from the perfect insect.

Forfeiture
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Forficula.

Forge.

Ear-wigs are very mischievous vermin in gardens, especially where carnations are preserved; for they are so fond of these flowers, that if care is not taken to prevent them, they will entirely destroy them, by eating off the sweet part at the bottom of the petals or leaves. To prevent which, most people have stands erected, which have a basin of earth or lead round each supporter, which is constantly kept filled with water. Others hang the hollow claws of crabs and lobsters upon sticks in divers parts of the garden into which those vermin get; and by often searching them, you will destroy them without much trouble, which will be of great service to your wall-fruit, for these are great destroyers also of all soft fruits.

FORGE, properly signifies a little furnace, wherein smiths and other artificers of iron or steel, &c. heat their metals red-hot, in order to soften them and render them more malleable and manageable on the anvil.

An ordinary forge is nothing but a pair of bellows, the nozzle of which is directed upon a smooth area, on which coals are placed. The nozzle of a pair of bellows may be also directed to the bottom of any furnace, to excite the combustion of the coals placed there, by which a kind of forge is formed. In laboratories there is generally a small furnace consisting of one cylindrical piece, open at top, which has at its lower side a hole for receiving the nozzle of a double bellows. This kind of forge-furnace is very convenient for fusions, as the operation is quickly performed, and with few coals. In its lower part, two inches above the hole for receiving the nozzle of the bellows, may be placed an iron-plate of the same diameter, supported upon two horizontal bars, and pierced near its circumference with four holes diametrically opposite to each other. By this disposition, the wind of the bellows, pushed forcibly under this plate, enters at these four holes; and thus the heat of the fire is equally distributed, and the crucible in the furnace is equally surrounded by it. This contrivance is used in the forge-furnaces for melting copper with this difference only, that these furnaces are square, which is a matter of no consequence.

As the wind of bellows strongly and rapidly excites the action of the fire, a forge is very convenient when a great heat is to be applied quickly; but it is not suitable when the heat is to be gradually increased.

The forge, or blast of bellows, is used in several operations in small; as to fuse salts, metals, ores, &c. It is also much used in works in the great, which require strong heat, without much management; and chiefly in the smelting of ores, and fusion of metallic matters.

FORGE is also used for a large furnace, wherein iron-ore, taken out of the mine, is melted down: or it is more properly applied to another kind of furnace, wherein the iron-ore melted down and separated in a former furnace, and then cast into sows and pigs, is heated and fused over again, and beaten afterwards with large hammers, and thus rendered more soft, pure, ductile, and fit for use.

FORGE, in the train of artillery, is generally called a *travelling forge*, and may not improperly be called a portable smith's shop: at this forge all manner of smith's work is made, and it can be used upon a march as well as in camp. Formerly they were very ill contrived, with 2 wheels only, and wooden supporters to

to prop the forge for working when in the park. Of late years they are made with 4 wheels, which answers their purpose much better.

FORGE for red-hot Balls, is a place where the balls are made red-hot before they are fired off: it is built about five or six feet below the surface of the ground, of strong brick-work, and an iron grate, upon which the balls are laid, with a very large fire under them.

FORGER, in law, one guilty of FORGERY.

FORGERY (from the French *forger*, i. e. *accudare*, *fabricare*, "to beat on an anvil, forge, or form,") may be defined at common law, to be "the fraudulent making or alteration of a writing to the prejudice of another man's right:" for which the offender may suffer fine, imprisonment, and pillory. And also, by a variety of statutes a more severe punishment is inflicted on the offender in many particular cases, which are so multiplied of late as almost to become general. We shall mention the principal instances.

By statute 5 Eliz. c. 14. to forge or make, or knowingly to publish or give in evidence, any forged deed, court-roll, or will, with intent to affect the right of real property, either freehold or copyhold, is punished by a forfeiture to the party grieved of double costs and damages; by standing in the pillory, and having both his ears cut off, and his nostrils slit, and seared; by forfeiture to the crown of the profits of his lands, and by perpetual imprisonment. For any forgery relating to a term of years or annuity, bond, obligation, acquittance, release or discharge of any debt or demand of any personal chattels, the same forfeiture is given to the party grieved; and on the offender is inflicted the pillory, loss of one of his ears, and half a year's imprisonment: the second offence, in both cases, being felony without benefit of clergy.

Besides this general act, a multitude of others, since the revolution (when paper-credit was first established), have inflicted capital punishment on the forging, altering, or uttering as true when forged, of any bank, bills, or notes, or other securities; of bills of credit issued from the exchequer; of south-sea bonds, &c.; of lottery tickets or orders; of army or navy debentures; of East-India bonds; of writings under seal of the London or royal-exchange assurance; of the hand of the receiver of the pre-fines, or of the accountant-general and certain other officers of the court of chancery; of a letter of attorney or other power to receive or transfer stock or annuities; and on the personating a proprietor thereof, to receive or transfer such annuities, stock, or dividends: also on the personating, or procuring to be personated, any seaman or other person, intitled to wages or other naval emoluments, or any of his personal representatives; and the taking, or procuring to be taken, any false oath in order to obtain a probate or letters of administration, in order to receive such payments; and the forging, or procuring to be forged, and likewise the uttering or publishing, as true of any counterfeited seaman's will or power: to which may be added, though not strictly reducible to this head, the counterfeiting of Mediterranean passes, under the hands of the lords of the admiralty, to protect one from the piratical states of Barbary; the forging or imitating of any stamps to defraud the public revenue: and the forging of any marriage register or licence: all which are, by distinct acts of parliament,

*Forge**Forgery.*

Forging.

liament, made felonies without benefit of clergy. By statutes 13 Geo. III. c. 52. & 59. forging or counterfeiting any stamp or mark to denote the standard of gold and silver plate, and certain other offences of the like tendency, are punished with transportation for 14 years. By statute 12 Geo. III. c. 48. certain frauds on the stamp-duties, therein described, principally by using the same stamps more than once, are made single felony, and liable to transportation for seven years. And the same punishment is inflicted by statute 13 Geo. III. c. 38. on such as counterfeit the common seal of the corporation for manufacturing plate-glass (thereby erected), or knowingly demand money of the company by virtue of any writing under such counterfeit seal.

There are also two general laws, with regard to forgery; the one 2 Geo. II. c. 25. whereby the first offence in forging or procuring to be forged, acting or assisting therein, or uttering or publishing as true, any forged deed, will, bond, writing obligatory, bill of exchange, promissory note, endorsement or assignment thereof, or any acquittance or receipt for money or goods, with intention to defraud any person (or corporation), is made felony without benefit of clergy. And by statute 7 Geo. II. c. 22. it is equally penal to forge, or cause to be forged, or utter as true, a counterfeit acceptance of a bill of exchange, or the number of any accountable receipt for any note, bill, or any other security for money, or any warrant or order for the payment of money, or delivery of goods. So that, through the number of these general and special provisions, there is now hardly a case possible to be conceived, wherein forgery, that tends to defraud, whether in the name of a real or fictitious person, is not made a capital crime.

FORGING, in law, the act of **FORGERY**.

FORGING, in smithery, the beating or hammering iron on the anvil, after having first made it red hot in the forge, in order to extend it into various forms, and fashion it into works. See **FORGE**.

There are two ways of forging and hammering iron. One is by the force of the hand, in which there are usually several persons employed, one of them turning the iron and hammering likewise, and the rest only hammering. The other way is by the force of a water-mill, which raises and works several huge hammers beyond the force of man; under the strokes whereof the workmen present large lumps or pieces of iron, which are sustained at one end by the anvils, and at the other by iron-chains fastened to the cieling of the forge. See **MILL**.

This last way of forging is only used in the largest works, as anchors for ships, &c. which usually weigh several thousand pounds. For the lighter works, a single man serves to hold, heat, and turn with one hand, while he hammers with the other.

Each purpose the work is designed for requires its proper heat; for if it be too cold, it will not feel the weight of the hammer, as the smiths call it, when it will not batter under the hammer; and if it be too hot, it will red-fear, that is, break or crack under the hammer.

The several degrees of heat the smiths give their irons, are, first, a blood-red heat; secondly, a white-flame-heat; and, thirdly, a sparkling or welding heat.

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FORISFAMILIATION, in laws When a child, ^{Forisfami-} upon receiving a portion from his father, or otherwise ^{liation} renounces his legal title to any further share of his father's succession, he is said to be *forisfamiliarized*. ^{Form.}

FORK, a well-known instrument, consisting of a handle and blade, divided at the end into two or more points or prongs.

The *pitch-fork* is a large utensil of this construction, employed in hay-making, &c.

The *table fork*, an instrument now so indispensable, did not come into use in England till the reign of James I. as we learn from a remarkable passage in Coryat. The reader will probably smile at the solemn manner in which this important discovery or innovation is related: "Here I will mention a thing that might have been spoken of before in discourse of the first Italian towns. I observed a custom in all those Italian cities and townes through which I passed, that is not used in any other country that I saw in my travels, neither do I think that any other nation of Christendome doth use it, but only Italy. The Italian and also most strangers that are commonant in Italy, doe always at their meals use a little fork when they eat their meate; for while with their knife which they hold in one hand they cut the meate out of the dish, they fasten the fork which they hold in the other hand upon the same dish, so that whatsoever he be that sitting in the company of any others at meale should unadvisedly touch the dish of meat with his fingers from which all the table doe cut, he will give occasion of offence unto the company as having transgressed the lawes of good manners, in so much that for his error he shall be at least brow-beaten if not reprehended in wordes. This form of feeding I understand is generally used in all parts of Italy, their forkes for the most part being made of yronn, Steele, and some of silver, but these are used only by gentlemen. The reason of this their curiosity is, because the Italian cannot by any means indure to have his dish touched with fingers, seeing all mens fingers are not alike cleane. Hereupon I myself thought good to imitate the Italian fashion by this forked cutting of meate, not only while I was in Italy, but also in Germany, and often times in England since I came home: being once quipped for that frequently using my forke, by a certain learned gentleman a familiar friend of mine, Mr Lawrence Whitaker; who in his merry humour doubted not to call me a table *Furcifer*, only for using a fork at feeding, but for no other cause."

FORLI, an ancient and considerable town of Italy, and capital of a territory of the same name, in Romagna, with a bishop's see. The public structures are very handsome; and it is seated in a fertile, healthy, and pleasant country, 10 miles south-east of Faenza, and 45 north-east of Florence. E. Long. 12. 1. N. Lat. 44. 28.

FORLORN-HOPE, in the military art, signifies men detached from several regiments, or otherwise appointed, to make the first attack in day of battle; or, at a siege, to storm the counterscarp, mount the breach, or the like. They are so called from the great danger they are unavoidably exposed to; but the word is old, and begins to be obsolete.

FORM, in physics, denotes the manner of being peculiar to each body; or that which constitutes it such

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Form. a particular body, and distinguishes it from every other. Mr Harris uses the term *form* likewise in another sense, as an efficient animating principle; to which he supposes Ovid to refer in the first lines of his *Metamorphosis*,

*In nova fert animus mutatas dicere formas
Corpora*

These animating forms are of themselves no objects either of the ear or of the eye; but their nature or character is understood in this, that were they never to exert their proper energies on their proper subjects, the marble on which the sculptor exercises his art would remain for ever shapeless, and the harp from which the harper calls forth sounds would remain for ever silent.

Thus, also, the animating form of a natural body is neither its organization nor its figure, nor any other of those inferior forms which make up the system of its visible qualities; but it is the power, which is yet able to produce, preserve, and employ these. It is the power, which first moves and then conducts that latent process, by which the acorn becomes an oak, and the embryo becomes a man; by which digestion is performed in plants and animals, and, which departing, the body ceases to live, and its members putrefy; and by which every being produces another like itself, and every species is continued. In animals, it is that higher faculty, which, by employing the organs of sense, peculiar to them as animals, distinguishes them as sensitive beings from vegetables; and it is also that more noble faculty, which by its own divine vigour, unassisted perhaps with organs, makes and denominates him a being intellectual and rational. So that Mr Harris reckons two sorts of forms, those which are passive elements, and those which are efficient causes. And all of them agree in this, that they give to every being its peculiar and distinctive character: and on the whole he concludes, that form appears in part to be an element, and in part an efficient cause, *i. e.* a cause which associates the constituent elements of natural substance, and which employs them, when associated, according to their various and peculiar characters.

The philosophers generally allow two principles of bodies: *matter*, as the common basis or substratum of all; and *form*, as that which specifies and distinguishes each; and which, added to a quantity of common matter, determines or denominates it this or that; wood, or fire, or ashes, &c.

Substantial forms seem to have been first broached by the followers of Aristotle, who thought matter, under different modes or modifications, not sufficient to constitute different bodies; but that something substantial was necessary to set them at a greater distance; and thus introduced substantial forms, on the footing of souls, which specify and distinguish animals. What led to this erroneous notion was the circumstances of life and death: For observing, that, as soon as the soul was departed out of a man, all motion, respiration, nutrition, &c. immediately ceased, they concluded, that all these functions depended on the soul, and consequently that the soul was the form of the animal body, or that which constituted it such: that, the soul was a substance, independent of matter, no body doubted; and hence the forms of other bodies

were concluded equally substantial. But to this it is answered, that though the soul be that by which a man is man, and consequently is the form of the human body, as human; yet it does not follow, that it is properly the form of this body of ours, as it is a body: nor of the several parts thereof, considered as distinct from each other: For those several parts have their proper forms so closely connected with their matter, that it remains inseparable therefrom long after the soul has quitted the body: thus, flesh has the form of flesh, bone of bone, &c. long after the soul is removed as well as before. The truth is, the body does not become incapable of performing its accustomed functions because the soul has deserted it; but the soul takes its leave, because the body is not in a condition to perform its functions.

The ancient and modern corpuscular philosophers, therefore, with the Cartesians, exclude the notion of substantial forms: and show, by many arguments, that the form is only the modus or manner of the body it is inherent in. And as there are only three primary modes of matter, viz. figure, rest, or motion, with two others arising therefrom, viz. magnitude and situation, the form of all bodies they hold to consist therein: and suppose the variations these modes are capable of, sufficient to present all the variety observable in bodies.

Forms are usually distinguished into *essential* and *accidental*.

Essential. Though the five modes abovementioned, generally taken, be adventitious; yet to this or that body, *e. gr.* to fire or water, they are essential: thus, it is *accidental* to iron, to have this or that magnitude, figure, or situation, since it might exist in different ones; yet to a knife or hammer, the figure, magnitude, and position of parts, which constitute it a hammer or knife, are essential; and they cannot exist or be conceived without them. Hence it is inferred, that though there be no substantial, there are essential, forms, whereby the several species of bodies become what they are, and are distinguished from all others.

Accidental forms, are those really inherent in bodies, but in such manner as that the body may exist in all its perfection without them. Such is whiteness in a wall, heat in water, a figure of a man in wax, &c.

FORM is also used, in a moral sense, for the manner of being or doing a thing according to rules: thus we say, a form of government, a form of argument, &c.

FORM, in law, the rules established and requisite to be observed in legal proceedings—The formal part of the law, or method of proceeding, cannot be altered but by the supreme power; for if once these outworks were demolished, there would be an inlet to all manner of invocation in the body of the law itself.

FORM, in carpentry, is used to denote the long seats or benches in the choirs of churches or in schools, for the priests, prebends, religious, or scholars, to sit on. Du Cange takes the name to be derived from hence, that the backs of the seats were anciently enriched with figures of painting and sculpture, called in Latin *formæ et typi*. In the life of St William of Roschild, we meet with *forma* as signifying a seat for an ecclesiastic, or religious, in a choir; and in that of St Lupi-

Form.

Form
Forman.

Lupicin, we have formula in the same sense. In the rule of the monastery of St Cæsarea, the nun who presides over the choir is called *primiceria, vel formari*.

At schools, the word *form* is frequently applied to what is otherwise termed a *class*. See CLASS.

FORM also denotes the external appearance or surface of a body, or the disposition of its parts, as to the length, breadth, and thickness.

FORM is also used among mechanics, for a sort of mould whereon any thing is fashioned or wrought.

PRINTERS FORM, an assemblage of letters, words, and lines, ranged in order, and so disposed into pages by the compositor; from which, by means of ink and a press the printed sheets are drawn.

Every form is inclosed in an iron-chase, wherein it is firmly locked by a number of pieces of wood: some long and narrow, and others of the form of wedges. There are two forms required for every sheet, one for each side; and each form consists of more or fewer pages according to the size of the book.

Hatters FORM, is a large block or piece of wood, of a cylindrical figure; the top thereof rounded, and the bottom quite flat. Its use is, to mould or fashion the crown of the hat, after the matter thereof has been beaten and felled.

Paper-maker's FORM, is the frame or mould wherein the sheets are fashioned. See PAPER.

FORMA PAUPERIS, in law is when the person has just cause of suit, but is so poor that he cannot defray the usual charges of suing at law or in equity; in which case, on making oath that he is not worth L. 5 in the world, on all his debts being paid, and producing a certificate from some lawyer that he has good cause of suit, the judge will admit him to sue in *forma pauperis*; that is, without paying any fee to counsellors, attorneys, or clerk: the statute 11 Hen. VII. c. 12. having enacted, that counsel and attorneys, &c. shall be assigned to such poor persons *gratis*. Where it appears that any pauper has sold or contracted for the benefit of his suit whilst it is depending in court such a cause shall be thenceforth totally dismissed and a person suing in *forma pauperis*, shall not have a new trial granted him, but is to acquiesce in the judgment of the court.

FORMAL, something belonging to or constituting the form of a thing. See FORM.

FORMALITY, the quality of a form, or formula, or that which constitutes and denominates them such.

FORMALITY, as defined in the schools, is any manner wherein a thing is conceived; or a manner in any object, importing a relation to the understanding, whereby it may be distinguished from another object. Thus, animality and rationality are formalities. The Scottists make great use of formalities, in opposition to the virtuality of the Thomists.

FORMALITIES, in matters of law are frequently used for the formulas themselves, or the rules prescribed for judicary proceeding. In contracts of strict law, all the formalities must be strictly observed: an omission of the least formality may ruin the whole convention.

The term is also used for a certain order, or decorum to be observed.

FORMAN (Andrew), archbishop of St Andrew's,

Forman.

earl of Pittenweem, and of Cottingham in England, one of the lords of the regency appointed by the states during the minority of king James V. of Scotland, legate a-latere, Primate of all the kingdom of Scotland, and archbishop of Bourges in France, was descended from the family of the Formans of Hutton in the shire of Berwick, and is considered to have been one of the best statesmen of the age in which he lived. He was employed in 1514, along with Robert Blackader archbishop of Glasgow and Patrick earl of Bothwell, to negotiate a match between Ja. IV. of Scotland and Margaret eldest daughter of Hen. VII. of England: which next year was ratified by the Scottish ambassadors. He was afterwards frequently employed as Scots ambassador to Rome, England, and France upon the most important occasions. In 1514 he was translated from the see of Moray, to which he had been appointed in 1502, to that of St Andrew's. During the time of his possessing the former, he was employed as mediator betwixt Pope Julius II. and Louis XII. of France, who were at that time at variance; and he happily succeeded in conciliating the difference. Having taken leave of the Pope, he passed through France on his return home, where he was kindly received by the king and queen who bestowed upon him the bishopric of Bourges in France, which annually brought him in 400 tons of wine, 10,000 franks of gold, and other smaller articles. Besides all this he was most liberally rewarded by Pope Julius; who promoted him to the archbishopric of St Andrew's, as has been already mentioned: conferred on him the two rich abbeys of Dunfermline and Aberbrothick: and made him his legate a-latere. At that time, however there were two other candidates for the archiepiscopal see. The learned Gavin Douglas bishop of Dunkeld having been nominated by the queen, had actually taken possession of it; but John Hepburn, a bold and factious man, having been preferred by the monks, drove out the officers of Gavin Douglas, and placed a strong garrison in the castle. So great was the power of this man, that when Forman was nominated by the Pope, no person could be found who durst proclaim the bulls for his election. At last lord Home, at that time the most powerful nobleman in Scotland, was induced, by large promises, besides some gifts of great consequence, among which was the donation of the abbacy of Coldingham to his youngest brother David, to undertake the task. It was executed at Edinburgh and St Andrew's; to which places lord Home's brother went with 10,000 men; though the doing of it, contrary to Forman's inclination, proved a source of much trouble to that nobleman afterwards. The quarrel betwixt Hepburn and Forman, however, was at last terminated by the latter surrendering the bishopric of Moray, as well as some years revenue of the archbishopric itself; paying Hepburn also 3000 French crowns annually out of his ecclesiastical revenues. On the appointment of the duke of Albany to the regency, Hepburn endeavoured to undermine the primate's credit with that noblemen, by representing him as one who had in a manner collected all the money in the country, and who consequently might endanger the tranquillity of the kingdom. These insinuations, however, were but little regarded by the regent: and Forman had the good fortune afterwards to make up a

Formation
I
Formice.

difference between him and the nobility, which was likely to be attended with much bloodshed. In 1517 the archbishop was appointed by the states one of the lords of the regency, on occasion of the duke of Albany's going to France. We have already mentioned his embassy to Pope Julius II. In M^r Kenzie's lives we are informed that in the collection of the Letters of the Scottish Kings from the year 1505 till the year 1626, in the lawyers library, there is a letter from that pope to king James IV. wherein he not only highly commends Forman, but likewise promises that at the first creation of cardinals he should be made one. This letter is dated the 6th of May 1511: but the pope died before he had an opportunity of performing his promise. In the same collection there is a letter from the duke of Albany to Leo X. Julius's successor, wherein he presses the pope to advance him to the dignity of a cardinal promised him by his predecessor, and to continue him his legate a-latere. Archbishop Forman died in 1521, and was buried at Dunfermline. Dempster says that he wrote a book against Luther, a book concerning the Stoic Philosophy, and a collection out of the Decretals.

FORMATION, in philosophy, an act whereby something is formed or produced.—For the formation of the foetus in the womb, see ANATOMY, n^o 109, 110.

FORMATION of Stones. See STONE.

FORMATION of Metals and Minerals. See METAL and MINERAL.

FORMATION, in grammar, signifies the manner of forming one word from another: thus *accountantship* is formed from *accountant*, and this last from *account*.

FORMEDON, in law, (*breve de forma donationis*), a writ that lies for a person who has a right to lands or tenements, by virtue of any entail, arising from the statute of Westm. 2 Ch. II.

This writ is of three kinds, viz. a descender, remainder and reverter. Formedon in *descender*, lies where a tenant in tail in feeoff a stranger, or is disseised and dies, and the heir may bring this writ to recover the lands. Formedon in *remainder*, lies where a man gives lands, &c. to a person in tail, and for default of issue of his body the remainder to another in tail: here if the tenant in tail die without issue, and a stranger abates and enters into the land, he in remainder shall have this writ. Formedon in *reverter*, lies where lands are entailed on certain persons and their issue, with remainder over for want of issue: and, on that remainder failing, then to revert to the donor and his heirs: in this case, if the tenant in tail dies without issue, and also be in remainder, the donor and his heirs, to whom the reversion returns, may have this writ for the recovery of the estate, though the same be alienated, &c.

FORMIÆ, or FORMIA, (anc. geog.), a maritime town of the Adjected or New Latium, to the south-east of Cajeta; built by the Lacedæmonians, (Strabo;) called originally *Hormiæ*, on account of its commodious harbour. An ancient municipium. *Formiani* the people who were admitted to the liberty of the city the very year in which Alexandria was built; but not to the right of suffrage till a long time after the second Punic war, (Livy). *Formiæ* at this day lies in ruins, near a place now called *Mola*.

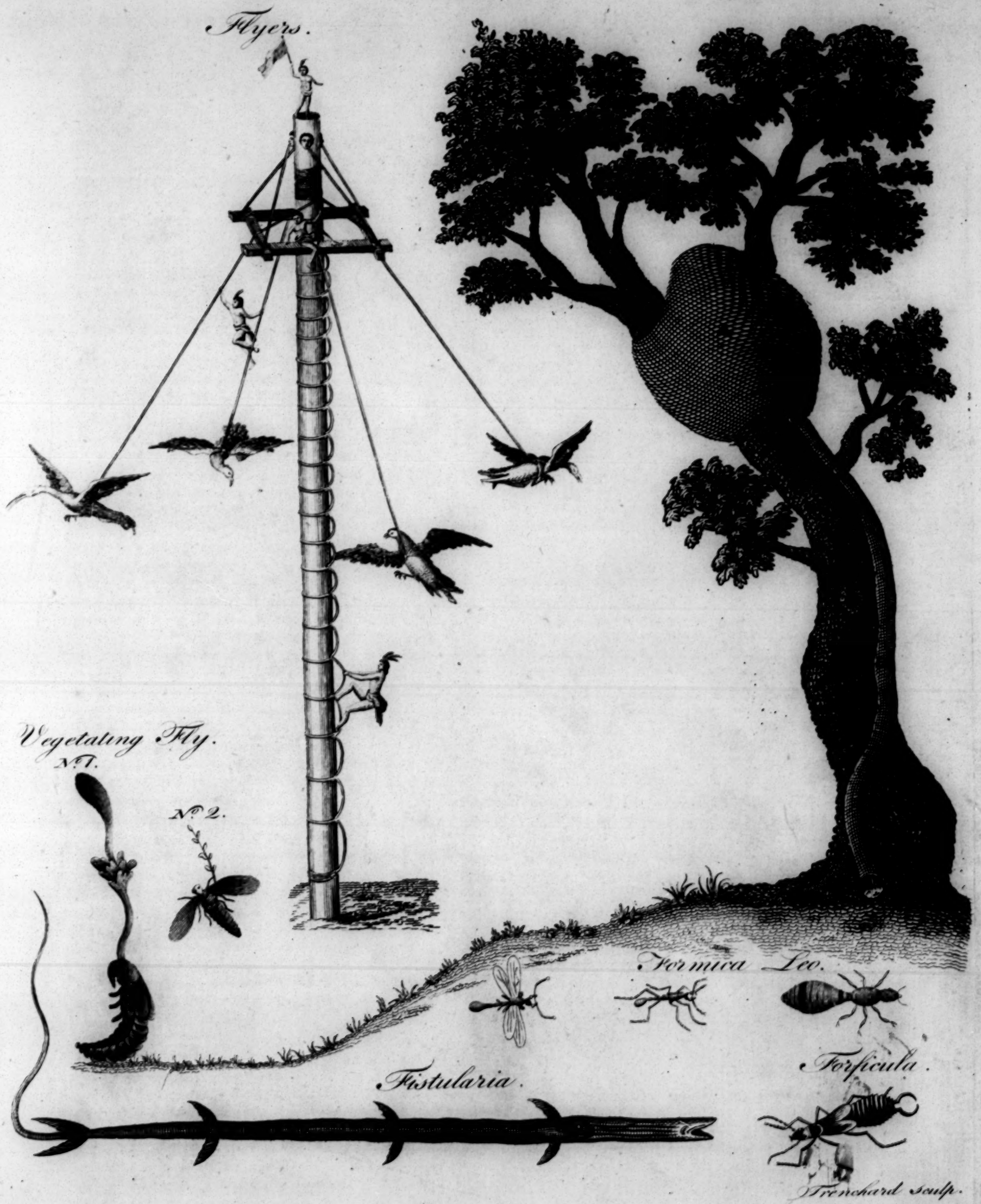
FORMICA, or the ANT, in zoology; a genus of *Formica*. insects belonging to the order of hymenoptera, the characters of which are these: there is a small scale, Plate betwixt the breast and belly and the joint is so deep, CXCVI. that the animal appears as if it were almost cut thro' the body. The females, and the neuters or working ants which have no sexual characteristics, are furnished with a hidden sting; and both the males and females have wings, but the neuters have none. There are 18 species most of them distinguished by their colours.

These insects keep together in companies like the bees, and maintain a sort of republic. Their nest is not exactly square, but longer one way than the other and in it there are a sort of paths, which lead to different magazines. Some of the ants are employed in making the ground firm, by mixing it with a sort of glue, for fear it should crumble and fall down upon them. They may be sometimes seen to gather several twigs, which serve them for rafters, which they place over the paths, to support the covering; they lay others across them, and upon them rushes, weeds, and dried grass, which they heap up into a double declivity, which serves to turn off the water from their magazines. Some of these serve to lay up their provisions, in and in others they lay their eggs.

As for the provisions, they lay up every thing that is fit for them to eat; and you may often see one loaded with pippin or grain of fruit, another with a dead fly, and several together with the carcase of a may-bug or other insect. If they meet with any they cannot bring away they eat it upon the spot, or at least so much of it as may reduce it to a bulk small enough for them to carry. They do not run about where they please, at all adventures: for some of them are sent abroad to make discoveries; and if they bring back news that they have met with a pear, or a sugar-loaf, or a pot of sweetmeats, they will run from the bottom of a garden, as high as the third story of a house, to come at it. They all follow each other in the same path, without wandering to the right or left; but in the fields they are more at their liberty, and are allowed to run about in search of game. There is a sort of green fly *, that does a great deal of mischief among the flowers, and which curls up the leaves of peach and pear trees: and these are surrounded with a sort of glue, or honey, which the ants hunt after very greedily; for they touch neither the plant nor the flies themselves. Next to this their greatest passion is to lay up hoards of wheat and other corn; and for fear the corn should sprout by the moisture of the subterraneous cells, they gnaw off the end which would produce the blade. The ants are often seen pushing along grains of wheat or barley much larger then themselves. It is remarkable, that if one ant meets another that is loaded, it always gives way to let it pass freely; or will help it if it be overburdened.

The ant lays eggs in the manner of the common flies; and from these eggs are hatched the larvæ, a sort of small maggots or worms without legs: these are sharp at one end and blunt at the other: and are white, but so transparent that the intestines are seen through the skin. These, after a short time, change into large white aureliæ, or chrysalids, which are what are usually called *ants eggs*. That end which is to be the tail is

* The  *phila*.





Formica. the largest, and that which is the head is somewhat transparent. The ants move these about at pleasure with their forceps. It is well known, that when a nest of these creatures is disturbed, and the aureliæ scattered about, the ants are at infinite pains to get together all that are unhurt, and make a nest for them again: nay, any ants will do this, and those of one nest will often take care of the aureliæ of another.

The care these creatures take of their offspring is remarkable. Whenever a hill is disturbed, all the ants are found busied in consulting the safety, not of themselves, but of the eggs or those larger bodies inclosing the maggot or young ant; they carry these down any way so as to get them out of sight, and will do this over and over as often as they are disturbed. They carry away the eggs and vermicles together in their confusion; but, as soon as the danger is over, they carefully separate them, and place each sort in parcels by themselves under shelter of different kinds, and at various depths, according to the different degrees of warmth and coverture the different states require. In the warm season of the year, they every morning bring up the eggs, as they are usually called, to the surface, or nearly so; and from ten in the forenoon to five in the afternoon, or thereabouts, all these will be found just under the surface: and if the hills be examined towards eight in the evening, they will be found to have carried them all down; and if rainy weather be coming on, it will be necessary to dig a foot deep or more, in order to find them. All human precautions have not hitherto been able to supply that degree of warmth and minute attention which the ants put in practice to forward the instant of their last metamorphosis. The insect, issuing forth to a new life, tears its white transparent veil; it is then a real ant, destitute of wings, if it has no sex; winged, if it be male or female, always to be known by a small erect scale placed on the thread which connects the body and thorax. Ants transact their amours in the air. The males, who are much smaller, seldom frequent the common habitation: but the females much larger, repair to it to deposit their eggs, which is all the labour they undergo; the winter's cold destroys them. As to the males it is uncertain whether they fall victims to the severity of winter, or are made over to the rage of the labouring ants.—These last pass the winter in a torpid state, as some other insects do, till spring restores them to their wonted activity: they have therefore no stores for winter, no consumption of provisions. What are commonly sold in markets for ant's eggs, are grubs newly hatched, of which pheasants, nightingales, and partridges, are very fond. The chief enemies to ants are the *formica leo*, magpies, and some other birds and beasts.

In the hotter countries, as Italy, Spain, and the West-Indies, ants are the greatest pest of the fields. Trees, which they are said to injure greatly, may be preserved from them by encompassing the stem, for four fingers breadth, with a roll of wool, newly pulled from the sheep's belly; or by laying saw-dust all round the stump of it. Some anoint the tree with tar, which has the same effect. But whatever harm they may do in pasture-lands, by making up hills for their habitation and impairing or drying up the grass, their damaging fruit-trees appears to be an unjust reproach.—On the contrary, in Switzerland they are made sub-

servient to the destruction of caterpillars. This is *Formica* done by hanging a pouch filled with ants upon a tree; and they, making their escape through an aperture contrived on purpose, run over the tree without being able to reach down to the ground, because care has been previously taken to besmear the foot of the tree with wet clay or soft pitch; in consequence of which, compelled by hunger, they fall upon the caterpillars and devour them. People pretend to say, that ants, taken inwardly, give a spring to the urinary ducts and to the organs of generation. The red colour which they communicate to blue paper, when crushed upon it, proves that they contain an acid (see CHEMISTRY, n^o 2d 907).

The large, black, winged ants of America, to avoid the great rains which fall there at particular seasons, make to themselves large nests on trees, with a covered way for them to go up and down on the lee-side of the tree. These nests are roundish on the outside, made of light brown earth, plastered smooth. They are larger than a bushel; and in the inside are many sinuous caverns or lodgings communicating with one another. See Plate CXCVI. A, The ants nest; B, The tubular passage, made of the same materials.

As to those insects called *white ants*, which abound in Africa and the East-Indies, they belong to a different genus; for which see the article TERMES.

FORMICA-LEO, the *Ant-Lion*, in zoology, an insect so called from its devouring great numbers of ants. It is the caterpillar or worm of a fly much resembling the libellæ or dragon-flies: and feeds chiefly upon ants, from which property it derives its name.

It is somewhat of the nature of the spider in its way of taking its prey, its manner of spinning, and the figure and softness of its body. It has, in its general figure, somewhat of the appearance of the millepes or wood-louse, so that some have mistaken it at first sight for that animal. It is of a dirty greyish colour, marked with some black spots; and these are also composed of many points when viewed with a microscope, which make it resemble a hedge-hog or porcupine. Its body is composed of several small rings, and has thence a wrinkled look. It has six legs, four are joined to the breast, and the other two to a longer part, which may be taken for its neck. Its head is small and flat, and it has two remarkable horns: these are about a sixth part of an inch long, and as thick as a hair: they are hard, hollow, and hooked at end like the claws of a cat. At the origin of each of these horns, it has a clear and bright black eye, which sees very distinctly, and gives the creature notice to escape from the sight of the smallest object.—This creature is not able to hunt after its prey, nor to destroy large insects; it can only draw into its snares such as come near its habitation, and of these very few are such as he can manage: all the winged kind are able to escape by flight; and the beetle kinds, and others that have hard shells upon their bodies, are of no use to him, as his horns cannot pierce them. The smallness of the ant, and the want of wings in the neuters, make them the destined prey of this devourer. The manner in which he catches his prey is as follows.

He usually encamps under an old wall, that he may be sheltered from the injuries of the weather; and he always chooses a place where the soil is composed of a fine dry sand. In this he makes a pit of the shape of

Formica. a funnel, or an inverted hollow cone. If he intends the pit to be but small, he thrusts down his hinder part into the sand, and by degrees plunges himself backward into it; and when he has got to a certain depth, he tosses out the loose sand which has run down with his head, artfully throwing it off beyond the edges of his pit. Thus he lies at the bottom of a small hollow, which is widest at the top, and comes sloping down to his body.

But if he is to make a larger pit, more pains are required to bring it to perfection. He first traces, in the surface of the sand, a large circle, which is the erected base or mouth of the pit he is to make in form of an inverted cone. He then buries himself in the sand near the edge of this circle, and carefully throws up the sand above him, with his head tossing it out beyond the circumference of the circle. Thus he continues his work, running down backwards in a spiral line all the way, and carefully throwing off the sand from above him, till he is come to the place of his rest, which is the point or reverted apex of the hollow cone he has formed by his passage. The length of his neck, and the flatness of his head, gives him a power of using the whole as a spade, and throwing off the sand with great ease; and his strength in this part is so great, that he is able to throw off a quantity of it to six inches distance. This is a power he exerts oftner, however, in throwing away the remains of the animals he has fed upon, that his den may not become frightful to others of the same species, by seeing their fellow carcases about it.

When he has finished his pit, he buries himself at the bottom of it among the sand, leaving no part above ground but the tips of his two horns, which he expands to the two sides of the pit. In this condition he lies and waits for his prey, and never comes up afterwards. When an ant, or any other such creature, chances to walk over the edges of his pit, its steps throw down a little of the sand, which naturally running down to the bottom of the pit, gives the enemy notice of his prey; he then tosses up the sand which covers his head, to bury the ant, and bring him down with its returning force to the bottom; and as one such attempt cannot be sufficient to prevent the ant's escape, he throws more and more sand upon him, till he by degrees brings him down. All the endeavours of the ant to escape, when once it is within the verge of the pit, are in vain; for as it attempts to climb, the sand runs away from under its feet, and it sinks the lower for every attempt. This motion of the sand also informs the enemy where it is, and directs him to throw up more sand in the right place; which it does, till the poor ant falls to the bottom between its horns. It then plunges the points deep into the ant's body; and having sucked all the juice out of the prey, it throws out the empty skin as far from the hole as it can. This done, it mounts up the edges of its pit, and if it has suffered any injury, repairs it with great care, and immediately buries itself again in the centre, to wait for another meal. The horns of this creature are its only organs for receiving nourishment; it never brings any animal which it has seized near to its head, but always holds it at the tip of the horns. They therefore plainly serve as syringes, to draw into its stomach the juices of the bodies of the insects it feeds upon: neither is there any mouth or

trunk, or any other organ to be discovered about its head, which could serve the purpose of eating; the head seeming only intended for throwing away the sand in forming the pit. The horns of this animal being so necessary to its life, nature has provided for the restoring them in case of accidents; and, if cut off, they are found to grow again.

The food this creature procures by its pit can be but little; and as it has no power of catching its prey any other way, its motion being only backwards, and that slowly, and by small spaces at a time, some people have believed its catching now and then an ant by this means was rather for diversion than hunger. But though the formica-leo will live a long time without food, and even pass through all its changes when shut up in a box, yet it is always ready to eat when food is offered it; it always appears starved and small when kept thus; and if a fly is given it in this hungry state, it will suck out all its juices, that the shell remaining may be rubbed to powder between the fingers, while the body of the creature that has sucked it appears remarkably swelled and distended; so that it is plain that the juices of the prey are conveyed into the body of the creature; though it is not easy to see by what means, the horns not appearing to have any perforation.

When the formica-leo has lived a proper time in this state, it leaves its pit, and is only seen drawing lines and traces on the surface of the sand. After this it buries itself under the surface; and there incloses itself in a fine web, in which it is to pass its transformation into the winged state. This case is made of a sort of silk which the creature spins in the manner of the spider, and of a quantity of the grains of sand cemented together by a glutinous humour which flows from its pores. This case, however, would be too harsh and coarse for the body of the creature, and therefore it serves only for the outer covering to defend it from injuries; the creature spinning one of pure and incomparably fine silk, of a beautiful pearl colour, within it, which covers its whole body.

When the creature has lain some time in this case, it throws off its outer skin, with the eyes, the horns, and every other part necessary to its life before, and becomes an oblong nymph, in which a careful eye may trace the form of the fly into which it is to be transformed. There may be seen, through its transparent covering, new eyes, new horns, wings, and all the other parts of the animal in its perfect state. This nymph makes its way about half out of the shell, and remains in this condition, but without farther life or motion, till the perfect fly makes its way out at a slit in the back. In this last state it much resembles the libellæ or dragon-flies common about the waters. The male couples with the female in this state only; and M. Poupert, to whom the world is obliged for this curious description, is of opinion, that the females lay only one egg; but but this is very different from the course of nature in the other animals of the same class.

When this insect forms its pit in a bed of pure sand, it is made and repaired with great ease; but where it meets with other substances among the sand, the labour becomes greatly the more embarrassing. If, for instance, when the creature has half formed its pit, and then comes to a stone of some moderate size, it does not desert the work for this, but goes on, intending to
remove

Formica.

Forming,
Formosa.

remove that impediment at last. When the pit is finished, the creature crawls backward up the side of the place where the stone is, and getting its backside under it, takes great pains and time to get it on a true poise, and then begins to crawl backward with it up the edge to the top of the pit, to get it out of the way. It is a very common thing to see a formica-leo in this manner labouring at a stone four times as big as its own body; and as it can only move backward, and the poise is hard to keep, especially up a slope of such crumbly matter as sand, which moulders away from under its feet, and necessarily alters the position of its body, the stone very frequently falls down when near the verge, and then it is sure to roll to the bottom. In this case the animal attacks it again in the same way, and often is not discouraged by five or six miscarriages of this kind; but, after all, attempts again, and at length gets it over the verge of the place. When it has done this, it does not leave it there, lest it should roll in again: but is always at the pains of pushing it farther on, till it has removed it to a necessary distance from the edge of the pit.

The common formica-leo moves only backward; but Mr Brouet has observed a species which moves forward in the common way of other animals, and makes no pit of this kind to entrap its prey, but seizes other insects by force.

FORMING is used for the act of giving being or birth to any thing.

The word is also simply used for giving the figure to any thing. The potter forms his vessels as he pleases. Geometry teaches how to form all kinds of figures.

It is likewise used for the producing of a thing: thus, the lineaments of the face began to be formed.

FORMING of a Siege, is the making lines of circumvallation to fortify the camp, and disposing things for the attack of a place in form.

They also say, to form a squadron or battalion; meaning, to range the soldiers in form of a squadron, &c.

FORMING the Line, is drawing up infantry, cavalry, and artillery, into line of battle. See LINE.

FORMING is also used in grammar, in speaking of certain tenses of verbs, which are made from others by a change of certain letters. The present tense is formed from the infinitive. Compound and derivative words also and even all that have any etymology, are said to be formed.

FORMOSA, an island in the Pacific Ocean, between, 119° and 122° of E. Long. and 22° and 25° N. Lat. about 100 miles east of Canton in China. It is subject to the Chinese; who, however, notwithstanding its vicinity, did not know of its existence until the year 1430. It is about 85 leagues in length, and 25 in breadth. A long chain of mountains which runs from north to south, divides it into two parts, the eastern and western. The Dutch formed an establishment in the western part in 1634, and built the fort of Zealand, which secured to them the principal port of the island; but they were driven from thence in 1659 or 1661 by a celebrated Chinese pirate, who made himself master of all the western part, which afterwards submitted in 1682 to the authority of Kang-he emperor of China.

This western part of Formosa is divided into three distinct governments, all subordinate to the governor of TAI-OUAN, the capital of the island, who is himself subject to the viceroy of the province of FOKIEN.

This island presents extensive and fertile plains, watered by a great number of rivulets that fall from the eastern mountains. Its air is pure and wholesome; and the earth produces in abundance corn, rice, and the greater part of other grains. Most of the Indian fruits are found here, such as oranges, bananas, pine-apples, guavas, papaws cocoa-nuts; and part of those of Europe, particularly peaches, apricots, figs, raisins, chestnuts, pomegranates, water-melons, &c. Tobacco, sugar, pepper, camphire, and cinnamon, are also common. Horses, sheep, and goats, are very rare in this island: there are even few hogs, although these animals abound in China. Domestic poultry, such as fowls, geese, and ducks, are exceedingly plenty; pheasants also are sometimes seen; and monkeys and stags, have multiplied so much, that they wander through the country in large flocks.

The inhabitants of Formosa rear a great number of oxen, which they use for riding, for want of horses and mules. They accustom them early to this kind of service, and by daily exercise train them to go as well and as expeditiously as the best horses. These oxen are furnished with a bridle, saddle, and crupper. A Chinese looks as big and proud when mounted in this manner as if he were carried by the finest Barbary courser.

Wholesome water fit for drinking is the only thing wanting in the island of Formosa. It is very extraordinary, that every kind of water in it is a deadly poison to strangers, for which no remedy has hitherto been found. "One of the governor's servants," says Father de Mailla, "whom I had in my train (a strong and robust man, trusting too much to the force of his constitution, would not believe what had been told him concerning this water: he drank some of it: and died in less than five days, after every medicine and antidote had been administered without success. There is none but the water of the capital which can be drunk: the mandarins of the place therefore always took care to transport a sufficiency of it in carts for our use." Our author adds, that at the bottom of a mountain a league distant from Fong-kan-hien, there is a spring that produces a stream, the water of which is of a whitish blue colour, and so noxious, that no one can approach it.

There are few mulberry-trees in Formosa, consequently little silk is made in the country. Numerous manufactures however, would soon be introduced into it, were the Chinese permitted indiscriminately to transport themselves thither, and to form establishments in the island. Those who go to it must be protected by passports from the Chinese mandarins, and these passports are sold at a dear rate: securities are besides required. This is not all: when they arrive, money must be given to the mandarins who are appointed to examine those who enter or quit the island, and who generally discharge this duty with the most rigid severity. If they give no present, or offer only a trifle they meet with little mercy; and are sure to be sent back, whatever passport they may have. The Chinese through policy, connive at these exactions, to prevent

Formosa. too great a number of people from emigrating to this island, which is rendered a place of great importance by its proximity to China. They fear, and with great reason (especially since Tartar emperors have been on the throne), that if any revolt should happen in Formosa, its influence might spread and occasion great disturbance in the whole empire. On this account, the Tartars keep a garrison there of 10,000 men; which they take care to change every three years, or even oftener if they judge it necessary.

Besides the capital, the Chinese have also two other cities, and some villages, where they inhabit alone; for they do not permit the Indians, who are their subjects, to live among them; they suffer none to remain but those who are either their slaves or domestics. These Indians are united into 45 villages; 36 of which lie to the north, and 9 towards the south. The northern villages are very populous, and the houses are built almost after the Chinese manner. The habitations of the southern islanders are only heaps of huts or cottages of earth. In these huts they have neither chairs, benches, tables, beds, nor any piece of furniture; the middle part is occupied by a kind of hearth or chimney, raised two feet high, and constructed of earth, upon which they dress their victuals. Their ordinary food is rice, other small grain, and the game which they catch by coursing or kill with their arms. These islanders run with such surprising swiftness, that they can almost outstrip the fleetest greyhound. The Chinese attribute this agility to the precaution they take of confining their knees and reins by a close bandage until the age of 14 or 15. Their favourite arms are lances, which they dart to the distance of 60 or 80 feet with the greatest dexterity and precision. They use bows and arrows, and can kill a pheasant on wing with as much certainty as an European sportsman could with a fusée. These people are very dirty in their manner of eating. They have neither plates, dishes, nor spoons, nor even the small sticks used in China. Whatever they dress is placed on a plain board or mat, and they make use of their fingers for conveying it to their mouths. They eat flesh half raw; and provided it has been only presented to the fire, it appears to them excellent. Their beds are formed of fresh-gathered leaves. They go almost naked, and wear only a piece of cloth which hangs from their girdle to their knees. Those among them who, according to the judgment of the chiefs of the village, have borne away the prize for agility in running or dexterity in the chase, obtain the honourable privilege of making on their skin, by a very painful operation, several fantastical figures of flowers, trees, and animals. All have the right of blackening their teeth, and of wearing ornaments of bracelets and crowns made of shells and crystal.

The islanders who inhabit the northern part, where the climate is something colder, clothe themselves with the skins of the stags which they kill in hunting. They make a kind of dress of them without sleeves, that pretty much resembles a dalmatic, or vestment worn at the altar by the Roman clergy. They wear on their heads caps in the form of a cylinder, made of palm-leaves, and ornamented with several crowns placed one above another, on the top of which they fix plumes composed of the feathers of a cock or pheasant.

The marriage ceremonies of the inhabitants of Formosa approach near to the simple laws of nature. They neither purchase, as in China, the women whom they espouse, nor does interest ever preside over their unions. Fathers and mothers are scarcely ever consulted. If a young man has a mind to marry, and has fixed his affection on a young girl, he appears for several days following near the place where she lives with a musical instrument in his hand. If the young woman is satisfied with the figure of her gallant, she comes forth and joins him: they then agree, and settle the marriage-contract. After this they give notice to their parents, who prepare a wedding-dinner, which is always given in the house where the young woman resides, and where the bridegroom remains without returning again to his father. The young man afterwards considers the house of his father-in-law as his own. He becomes the whole support of it, and he has no farther connection with that of his father; like married women in Europe, who generally quit their paternal home in order to live with their husbands. These islanders therefore seldom offer up vows for obtaining male children: they prefer daughters, because they procure them sons-in-law, who become the supports of their old age.

Although the Formosans are entirely subjected to the Chinese, they still preserve some remains of their ancient government. Each village chooses three or four old men from among those who have the greatest reputation for probity. By this choice they become the rulers and judges of the rest of the hamlet. They have the power of finally determining all differences; and if any one should refuse to abide by their judgment, he would be immediately banished from the village, without hopes of ever being able to re-enter it, and none of the inhabitants would afterwards dare to receive him.

The natives pay in grain the tribute imposed on them by the Chinese. To regulate every thing that concerns the laying on and collecting of this impost, government have established a Chinese in every village, who is obliged to learn the language, and act as interpreter to the mandarins. These interpreters are most cruel extortioners to the miserable people, whom they ought rather to protect: they are such insatiable leeches, that they can scarcely ever be satisfied. This daily and domestic tyranny has already caused the defection of three villages in the southern part of the island, where formerly there were twelve. The inhabitants of these villages revolted, expelled their interpreters, refused to pay tribute any longer to the Chinese, and have united themselves to the independent nation in the eastern part of the island.

It was in the island of Formosa that John Struys affirms to have seen with his own eyes a man who had a tail more than a foot in length, covered with red hair, and greatly resembling that of an ox. This man with a tail said, that his deformity, if it was one, proceeded from the climate, and that all those of the southern part of the island were born with tails like his.—But John Struys is the only author who attests the existence of this extraordinary race of men; no other writer who has spoken of Formosa makes the least mention of them. Another circumstance, no less singular, and which appears to be little better authenticated,

Formosa.

*Dutch East
India Com-
pany Voy-
ages, vol. v.
p. 96.

licated, is, that in this island women are not permitted to bring forth children before they are 35, although they are at liberty to marry long before that age. Rechteren * thus expresses himself concerning this strange custom:

"When women are first married, they bring no children into the world; they must, before that is permitted, have attained the age of 35 or 37. When they are big with child, their priestesses pay them a visit, and tread on their bellies with their feet, if it be necessary, and make them miscarry, with perhaps greater pains than they would have in being brought to bed. It would be not only a shame, but an enormous crime, to bring forth a child before the term prescribed. I have seen some females who had already destroyed the fruit of their womb 15 or 16 times, and who were big for the 17th when it was lawful for them to bring forth a living child."

To our description of Formosa we shall add the following account of the dreadful disaster that lately befel this unhappy island. The details were conveyed by a letter from Peking, addressed to M. Bertin, and dated the 14th of July 1782.

"The waters of the ocean have well nigh deprived China of one of its most valuable maritime possessions. The island of Tay-ouan, known in Europe by the name of Formosa, has been almost swallowed up by them. It has been reported here, that part of the mountain which divides the island, has sunk and disappeared; that the rest has been overturned; and that the greater part of the inhabitants have perished. Such have been for some days the popular reports in this capital. Government, however, has put a stop to them, by informing the public of the real truth; such as it has been announced to the emperor by the officers who have this small portion of his territories under their jurisdiction. I cannot do better than transcribe what they have written. The dispatches of the Chinese officers addressed to the emperor, run thus:

"Bechen, governor-general of the provinces of Fokien and Tche-Kyang-ya, viceroy of Fokien, and others, make known to your majesty the disaster that has lately befallen the island of Tay-ouan. Mon-ha-hon, and other principal officers of this island, have acquainted us, that on the 21st of the fourth moon (May 22d, 1782), a most furious wind, accompanied with heavy rain and a swell of the sea greater than ever remembered, had kept them under continual apprehension of being swallowed up by the waves, or buried in the bowels of the earth, from the hour of *yn* until the hour *ouei* (A). This dreadful tempest seemed to blow at the same time from the four cardinal points of the compass, and continued with equal violence during the abovementioned time. The buildings where the tribunals were held, the public granaries, the barracks, salt warehouses, and works, have been totally destroyed, and every thing they contained is lost: warehouses and work-shops, as well as private houses, for the most part, present nothing but ruins and heaps of rubbish. Of 27 ships of war which were in the harbour 12 have disappeared; two others have been dashed to pieces,

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and 10 are shattered in such a manner that they are rendered entirely unfit for service; other smaller vessels of different sizes, above 100 in number, have shared the same fate; eighty have been swallowed up; five others, which had just taken in a lading of rice for Fokien, have sunk, and their cargoes, which amounted to 100,000 bushels, are wholly lost. With regard to other vessels, whether small or great, which had not entered the harbour, 10 or 12 of the largest are reckoned to have been swallowed up; those of inferior size, as well as a prodigious number of barks, boats, and other small vessels of different kinds, have disappeared, without leaving the least piece of wreck behind them. As the whole island has been covered with water, the provisions have been either swept away or spoilt, so as to render them prejudicial to the health of those who use them in their present state. The crops are entirely lost. When we shall have been informed of particulars, we shall not fail to give your majesty the earliest intelligence of them.—After having received this letter from Mon-ha-hon, and the other principal officers residing at Tay-ouan, I employed the utmost diligence to give every assistance in my power to this unfortunate island; and I ordered the travelling commissary, and Trey-ouer, general of the province, to get particular information of the number of those who have perished, of the houses destroyed, and of the quantity of salt and other provisions that have been lost: I have likewise enjoined them to rebuild with the utmost expedition the tribunals, granaries, and other public edifices; to dispatch proper persons to search for the vessels and ships that have disappeared; to repair those which are not altogether unfit for service, and to send immediately to the neighbouring countries for salt and other necessary provisions; but above all, to ascertain in the most accurate manner the different losses sustained by the inhabitants, and the precise number of people that have perished, in order that I may be able to give the fullest information to your majesty."

"The emperor of China caused a particular detail of these losses to be published, together with the following letter:

"Tchang-yu, &c. Tchem-hoei-Thon-Tsong-tou of Fokien, and others, have informed me of the dismal event that hath taken place in the island of Tay-ouan, which is a district of the province of Fokien. They have written to me, that on the 21st of the fourth moon. [Here the emperor repeats what is contained in the preceding letter, and continues thus]: I command Tsong-tou to get the best information he can of the different losses sustained by the inhabitants of the island, and to transmit the particulars to me, in order that I may give them every assistance to repair them. My intention is, that all the houses which have been thrown down shall be rebuilt entirely at my expence; that those be repaired which are only damaged; and that provisions, and every thing which the people stand in immediate want of, be supplied them. I should feel much pain, were even one among them to be neglected: I therefore recommend the utmost di-

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(A) The hours of the Chinese are double ours: the hour *yn* begins at three in the morning and ends at five; *ouei* begins at three in the afternoon and ends at five.

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ligence and strictest inquiry, as I am desirous that none of my subjects should entertain the least doubt of the tender affection which I have for them; and that they should know that they are all under my eyes, and that I myself will provide for their wants. With regard to my ships of war, tribunals, and public edifices, let them be restored to their former state with money taken from the public treasury, and let the general account of the whole expence be laid before me."

The missionary who sent this account farther says, from these letters it evidently appears, that this disaster happened in consequence of an earthquake; but he adds, that the volcano which occasioned it must be at a prodigious depth below the sea. He does not pretend to give an explanation of it; he is contented with observing, that the same scene seems to have passed at the island of Formosa as at Lima and Lisbon.

FORMULA, or FORMULARY, a rule or model, or certain terms prescribed or decreed by authority, for the form and manner of an act, instrument, proceeding, or the like.

FORMULA, in church-history and theology, signifies a profession of faith.

FORMULA, in medicine, imports the constitution of medicines, either simple or compound, both with respect to their prescription and consistence.

FORMULARY, a writing, containing the form or formula of an oath, declaration, attestation, or abjuration, &c. to be made on certain occasions.

There are also formularies of devotion, of prayers, &c. Liturgies are formularies of the public service in most churches.

FORNACALIA, or FORNICALIA, in Roman antiquity, a festival instituted by Numa, in honour of Fornax, the goddess of ovens; wherein certain cakes were made, and offered in sacrifice before the ovens.

FORNICATION (*Fornicatio*, from the *fornices* in Rome, where the lewd women prostituted themselves for money), is whoredom, or the act of incontinency, between single persons; for if either of the parties is married, it is *adultery*. Formerly court-leets in England had power to inquire of and punish fornication and adultery; in which courts the king had a fine assessed on the offenders, as appears by the book of Domesday.

In the year 1650, when the ruling powers found it for their interest to put on the semblance of a very extraordinary strictness and purity of morals, not only incest and wilful murder were made capital crimes, but also the repeated act of keeping a brothel, or committing fornication, were (upon a second conviction) made felony without benefit of clergy. But, at the restoration, when men, from an abhorrence of the hypocrisy of the late times, fell into a contrary extreme of licentiousness, it was not thought proper to renew a law of such unfashionable rigour. And these offences have been ever since left to the feeble coercion of the spiritual court, according to the rules of the canon law; a law which has treated the offence of incontinence, nay, even adultery itself, with a great degree of tenderness and lenity; owing perhaps to the constrained celibacy of its first compilers. The temporal courts therefore take no cognisance even of the crime of adultery otherwise than as a private injury. See ADULTERY.

The evils of fornication, which too many wish to

consider as no sin, may be judged of from the following particulars.

1. The malignity and moral quality of each crime is not to be estimated by the particular effect of one offence, or of one person's offending, but by the general tendency and consequence of crimes of the same nature. In the present case, let the libertine consider and say, what would be the consequence, if the same licentiousness in which he indulges were universal? or what should hinder its becoming universal, if it be innocent or allowable in him?

2. Fornication supposes prostitution; and by prostitution the victims of it are brought to almost certain misery. It is no small quantity of misery in the aggregate, which, between want, disease, and insult, is suffered by those outcasts of human society who infest populous cities; the whole of which is a general consequence of fornication, and to the increase and continuance of which every act and instance of fornication contributes.

3. Fornication produces habits of ungovernable lewdness, which introduce the more aggravated crimes of seduction, adultery, violation, &c. The criminal indulgences between the sexes prepare an easy admission for every sin that seeks it; they are, in low life, usually the first stage in mens progress to the most desperate villainies; and in high life, to that lamented dissoluteness of principle, which manifests itself in a profligacy of public conduct, and a contempt of the obligations of religion and moral probity.

4. Fornication perpetuates a disease, which may be accounted one of the forest maladies of human nature, and the effects of which are said to visit the constitution of even distant generations.

The passion being natural, proves that it was intended to be gratified; but under what restrictions, or whether without any, must be collected from different considerations.

In the Scriptures, fornication is absolutely and peremptorily condemned. 'Out of the heart proceed evil thoughts, murders, adulteries, fornication, thefts, false witness, blasphemies; these are the things which defile a man.' These are Christ's own words; and one word from him upon the subject is final. The apostles are more full upon this topic. One well-known passage in the Epistle to the Hebrews may stand in the place of all others; because, admitting the authority by which the apostles of Christ spake and wrote, it is decisive. 'Marriage and the bed undefiled is honourable amongst all men, but whoremongers and adulterers God will judge; which was a great deal to say, at a time when it was not agreed even amongst philosophers that fornication was a crime.'

Upon this subject Mr Paley adds the following observations*.

"The Scriptures give no sanction to these austerities which have been since imposed upon the world under the name of Christ's religion, as the celibacy of the clergy, the praise of perpetual virginity, the *prohibitio concubitus cum gravida uxore*; but with a just knowledge of, and regard to the condition and interest of the human species, have provided in the marriage of one man with one woman an adequate gratification for the propensities of their nature, and have restrained them to that gratification.

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* *Moral and Political Philosophy, Philadelphia edit. P. 195.*

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"The avowed toleration, and in some countries the licensing, taxing, and regulating of public brothels, has appeared to the people an authorising of fornication, and has contributed, with other causes, so far to vitiate the public opinion, that there is no practice of which the immorality is so little thought of or acknowledged, although there are few in which it can more plainly be made out. The legislators who have patronized receptacles of prostitution ought to have foreseen this effect, as well as considered, that whatever facilitates fornication, diminishes marriages. And as to the usual apology for this relaxed discipline, the danger of greater enormities if access to prostitutes were too strictly watched and prohibited; it will be time enough to look to that, after the laws and the magistrates have done their utmost. The greatest vigilance of both will do no more, than oppose some bounds and some difficulties to this intercourse. And after all, these pretended fears are without foundation in experience. The men are in all respects the most virtuous in countries where the women are most chaste.

"If fornication be criminal, all those incentives which lead to it are accessaries to the crime; as lascivious conversation, whether expressed in obscene or disguised under modest phrases; also wanton songs, pictures, books; the writing, publishing, and circulating of which, whether out of frolic or for some pitiful profit, is productive of so extensive a mischief from so mean a temptation, that few crimes within the reach of private wickedness have more to answer for, or less to plead in their excuse.

"Indecent conversation, and by parity of reason all the rest, are forbidden by St Paul, Eph. iv. 29. 'Let no corrupt communication proceed out of your mouth; and again, Col. iii. 8. 'Put filthy communication out of your mouth.'

"The invitation or voluntary admission of impure thoughts, or the suffering them to get possession of the imagination, falls within the same description, and is condemned by Christ, Matt. v. 28. 'Whoever looketh on a woman to lust after her, hath committed adultery with her already in his heart.' Christ, by thus enjoining a regulation of the thought, strikes at the root of the evil."

FORNIX, in anatomy, is part of the corpus callosum in the brain; so called, because of a distant resemblance it hath to the arches of ancient vaults when viewed in a particular manner.

FORRAGE, in the military art, denotes hay, oats, barley, wheat, grass, clover, &c. brought into the camp by the troopers, for the sustenance of their horses.

It is the business of the quarter-master general to appoint the method of forrage, and post proper guards for the security of the foragers.

FORRES, a parliament town of Scotland in the county of Murray, classing with Inverness, Fortrose, and Nairn. It is a small well-built town, pleasantly situated on an eminence near the river Findhorn. The country about it has a cheerful appearance, having a few gentlemen's seats, with some plantations about them. On a hill west of the town are the remains of a castle; and a melancholy view of a number of sand-hills, that now cover that tract of land which was formerly the estate of a Mr Cowben in the parish of Dyke. This inundation was occasioned by the influx

of the sea and the violence of the wind. It had been the custom to pull up the bent, a long spiry grass near the shore for litter for horses, by which means the sand was loosened, and gave way to the violence of the sea and wind, which carried it over several thousand acres of land. The people having being prevented from pulling up any more of the grass, the progress of the sand is now nearly stopped, and the sea has retired; but the wind has blown some of the sand from the hills over Colonel Grant's land, and destroyed near 100 acres. A sand-bank, which is all dry at low-water, runs out from this place for several miles into the Murray-Firth. Some of the land, which has been long forsaken by the water is now beginning to be useful again, and is turned into grazing land. At Forres, coarse linen and sewing thread are made. About a mile from the town, on the left-hand side of the road, is a remarkable obelisk, said to be the most stately monument of the Gothic kind to be seen in Europe. It has been the subject of many able pens; but totally overlooked by Dr Johnson, who says, "At Forres, we found good accommodation, but nothing worthy of particular remark."—It is thus described by Mr Cordiner, in a letter to Mr Pennant: "In the first division, underneath the Gothic ornaments at the top, are nine horses with their riders, marching forth in order: in the next is a line of warriors on foot, brandishing their weapons, and appear to be shouting for the battle. The import of the attitudes in the third division is very dubious, their expression indefinite. The figures which form a square in the middle of the column are pretty complex but distinct; four serjeants with their halberds guard a company, under which are placed several human heads, which have belonged to dead bodies piled up at the left of the division; one appears in the character of executioner severing the head from another body; behind him are three trumpeters sounding their trumpets, and before him two pair of combatants fighting with sword and target. A troop of horse next appears, put to flight by infantry, whose first line have bows and arrows; the three following, swords and targets. In the lowermost division now visible, the horses seem to be seized by the victorious party, their riders beheaded, and the head of their chief hung in chains or placed in a frame; the others being thrown together beside the dead bodies under an arched cover. The greatest part of the other side of the obelisk, occupied by a sumptuous cross, is covered over with an uniform figure, elaborately raised and interwoven with great mathematical exactness. Under the cross are two august personages, with some attendants, much obliterated, but evidently in an attitude of reconciliation; and if the monument was erected in memory of the peace concluded between Malcolm and Canute, upon the final retreat of the Danes, these large figures may represent the reconciled monarchs. On the edge below the fretwork are some rows of figures joined hand-in-hand, which may also imply the new degree of confidence and security which took place, after the feuds were composed, which are characterized on the front of the pillar. But to whatever particular transaction it may allude, it can hardly be imagined, that in so early an age of the arts in Scotland as it must have been raised, so elaborate a performance would have been undertaken but in consequence of an event

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Forskohlea of the most general importance; it is therefore surprising, that no distinct traditions of it arrived at the era when letters were known. The height of this monumer (called *King Sueno's stone*) above the ground is 23 feet; besides 12 or 15 feet under ground. Its breadth is 3 feet 10 inches by 1 foot 3 inches in thickness."

Vitrified
Forts.

FORSKOHLEA, in botany: A genus of the pentagynia order, belonging to the decandria class of plants. The calyx is pentaphyllous, and longer than the corolla. There are ten petals spatulated, *i. e.* roundish before, with a linear base.

FORESTERA, in botany: A genus of the triandria order, belonging to the gynandria class of plants. The perianthium is double; the exterior one beneath three leaved; the exterior one above, and six-cleft; the corolla tubular.

FORT, in the military art a small fortified place, environed on all sides with a moat, rampart, and parapet. Its use is to secure some high ground, or the passage of a river, to make good an advantageous post, to defend the lines and quarters of a siege, &c.

Forts are made of different figures and extents, according as the ground requires. Some are fortified with bastions, others with demi-bastions. Some again are in form of a square, others of a pentagon. A fort differs from a citadel, as this last is built to command some town.

Vitrified Forts, a very singular kind of structures found in the highlands and northern parts of Scotland, in which the walls have the appearance of being melted into a solid mass, so as to resemble the lava of a volcano, for which indeed they have been taken by several persons who have visited them.

These walls were taken notice of by Mr Williams an engineer, who wrote a treatise upon the subject, and was the first who supposed them to be the works of art; other naturalists having attributed them to a volcanic origin. These works are commonly situated on the tops of small hills, commanding an extensive view of the adjacent valley or low country. The area on the summit, varying, as is supposed, according to the number of cattle the proprietor had to protect, or the dependants he was obliged to accommodate, is surrounded with an high and strong wall, of which the stones are melted, most of them entirely; while others, in which the fusion has not been so complete, are sunk in the vitrified matter in such a manner as to be quite inclosed with it; and in some places the fusion has been so perfect, that the ruins appear like masses of coarse glass. Mr Williams has not only absolutely determined the walls in question to be the works of art, but has even hazarded a conjecture as to the manner in which they were constructed, and which, according to him, was as follows. Two parallel dikes of earth or sod being raised, in the direction of the intended wall, with a space between them sufficient for its thickness, the fuel was put in, and set on fire. The stones best adapted for the purpose, called the *plum-pudding stone*, are every where to be found in the neighbourhood. These were laid on the fuel, and when melted, were kept by the frame of earth from running off; and by repeating the operation, the wall was raised to a sufficient height. This opinion of the stones being thrown in without any order, is thought to be con-

firmed by the circumstance of there not being any where a large one to be seen, nor a stone laid in any particular direction, nor one piece which has not in some degree been affected by the fire. Mr Williams mentions a fact tending to confirm his hypothesis, viz. of a brick kiln situated on the declivity of an eminence, so as to be exposed to the wind, which happening to rise briskly one time when the kiln was burning, so increased the heat, that the bricks were melted, and ran, like a lava, for a considerable way down the hill.

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The opinion of Mr Williams has been embraced by several other authors; particularly Mr Freebairn and Dr Anderson, the latter having published two treatises upon these buildings in the *Archæologia*. In the same work, however, we meet with a paper by the Hon. Daines Barrington, in which the author expresses quite different sentiments. He observes, that Mr Williams, and the other antiquaries, who suppose the walls in question to be the works of art, imagine that the reason of their being constructed in this manner was the ignorance of cement, which in these remote ages prevailed in Scotland: but with respect to this circumstance, he says, that if one side of the wall only was heated, and that to any considerable height, the matter in fusion would in all likelihood drop down to the bottom, without operating as any cement to the loose stones thrown in amongst it. This circumstance of the walls being vitrified only on one side, is indeed remarkable, and takes place in most of the forts of this kind to be met with at present: but with regard to it, Mr Barrington observes, that he himself has been twice in the Highlands of Scotland, and has found very few hills of any height which were clothed with wood; the trouble therefore of carrying it up to the top of such a mountain would be very considerable. But to this it might easily be replied, that we cannot by any means argue from the present state of the hills in the Highlands to their state in a very remote period of antiquity. At that time, it is neither impossible nor in the least improbable, that most of the hills in Scotland were evergrown with wood; or at any rate, there undoubtedly was plenty of peat, which is still used as fuel in Scotland, and which affords such a strong heat as to be advantageously employed in smelting iron*, as we are informed by M. Magellan. A third particular mentioned by Mr Williams is, that these inclosures were intended as places of defence; and in support of this opinion alleges, that there are dried wells found within most of them. But on this Mr Barrington observes, that shelter from the weather was also necessary "upon the top of a bleak Scotch hill, whilst whisky (or a succedaneum for it) would be often in greater request than the bare element of water." This objection, however, as well as the last, is evidently very frivolous for these buildings might have roofs as well as any other; and whatever necessity there might be for whisky occasionally, water was certainly an indispensable requisite.

* See the
article Peat

Mr Barrington having thus given his reasons for dissenting from the opinion of Mr Williams and the antiquaries just mentioned, proceeds to state his own. He tells us, that having travelled for 21 years the most mountainous circuit in Wales, he has frequently observed inclosures of dry stones, particularly

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larly a long tract in the western part of Merionethshire, called in the language of the country *Duffryn*, i. e. *the vale*. On first viewing these small inclosures made with walls of thick stones, he was at a loss to imagine how it could be worth while to construct such strong fences for so inconsiderable a piece of ground as they inclosed: but, on examining the adjacent country, he found it almost entirely covered with stones of a similar kind; and, of consequence, the smaller the space to be cleared, the less expensive would be the removal. "For the same reason (says he), such dry walls are often of a great thickness, and sometimes the corners of the inclosures are filled with stones to a great width, this being the only possible means of procuring pasture." To a practice of the same kind our author would ascribe the origin of the works in question: but the objection occurs very strongly, that the walls in Scotland, are vitrified, and it is not to be supposed that such trouble would be taken with fences made in such a fortuitous manner. This objection our author owns, would indeed be unanswerable, on the supposition that the vitrification was made on purpose to strengthen the walls of the fortresses; "but (says he) may not the vitrification have been occasioned by volcanoes, or by what are called *bloomeries*? The same effect may be produced likewise on dry walls of stone by lightning passing along them. The loose stones in either case would not be rejected because they were glassy, and would be piled up in the fence of the inclosure; as the great point upon these occasions is to clear the ground, and remove the incumbering stones to the smallest distance. One of the advocates for the designed and not fortuitous vitrification, says, that the pieces he had procured did not resemble what is called *lava*. But every volcano is not necessarily an Etna or a Vesuvius; and consequently the matter disgorged from the crater must perpetually vary both in substance and form. Vitrified masses, larger or smaller, will likewise be produced by the same means. It may be contended indeed, that pasture thus procured, by clearing the ground, would be more convenient at the bottom or on the sides, than on the top of the hills: but to this I answer, that in rocky countries you must get what pittance you can of soil, and often it will happen that the only detached and removeable stones are on the summit. When such inclosures have been made, they became very convenient for putting cattle into; and hence perhaps some of the wells which Mr Williams hath mentioned."

Our author concludes his dissertation on this subject by observing, that if vitrification answered the purpose of cement, it is very extraordinary that the ancient inhabitants of Scotland did not apply it to the houses or huts in which they constantly lived, but reserved this troublesome and expensive process merely for a fortification, which might not perhaps be used in half a century against an enemy. On this it is almost superfluous to observe that in the ages of barbarity and bloodshed, in which these inclosures, whether natural or artificial, were supposed to be used as fortresses, war was so frequent, that a defence against an enemy might seem to be necessary every day, instead of once in half a century. Before we proceed further in the argument, however, it will be necessary to give some

account of the situation and appearance of these fortresses.

According to Mr Cardonnel, the largest of them is situated on the hill of Knockfarril, to the south of the valley of Strathpeffer, two miles west from Dingwall in Rossshire. The inclosure is 120 feet long and 40 broad within the walls; strengthened on the outside with works at each end. A range of habitations seem to have been erected against, or under, the shade of the outward wall; of which those on the south-side seem to have been higher and larger than those on the north. There are two wells in the middle, which, on being cleared out, filled with water. On the skirts of the hill to the south are many detached buildings; which, from the stratum of dung found on removing the ruins, appears plainly to have been used for securing the cattle. This place seems to have been anciently of consequence, and the residence of some powerful chief, from a road which leads through the hills to the north-west sea. To the east of the works are a number of vitrified ruins, extending for a considerable way along the ridge of the hill. The end next the fort seems to have joined the outer wall, and consisted either of two parallel walls, closed above, with a passage between them under cover, or a high wall broad enough to walk on. In this wall there is the vestige of a break about the middle, over which a bridge has been laid, to be drawn up or removed as occasion might require.

The fort next in consequence to that of Knockfarril is situated on the hill of Craig-Phadrick near Inverness, "which (says Mr Cardonnel) has this peculiar circumstance that there appears to have been two vitrified walls quite round the area. The inner one seems to have been very high and strong: the outer wall but low: probably the space between was intended for securing their cattle, as there are no remains of dry-stone buildings, such as are found near the rest. Several parts of this outer wall appear quite entire, sticking to the firm bare rock, where it was first run. The area within the inner wall is near 80 paces long, and 27 broad." Of this we have an account † by Alexander Fraser-Tyler Esq: professor of civil history in the university of Edinburgh, who visited it in the year 1782. The hill itself is a small conical eminence, forming the eastern extremity of that ridge of mountains which bounds Loch-Ness on the northwest side. It is situated about a mile to the north of Inverness, and is accessible on two different quarters, viz. the west and south-east; the former affording entrance by a narrow level ridge joining the hills on Loch-Ness, and the latter by an easy ascent from the high ground above Inverness. On approaching the hill from the west we first meet with a road cut through the rock from the bottom to the top, in most places 10 feet broad and nearly as deep; winding, for about 70 feet, with an easy serpentine direction, by which we gain an ascent over a steep rock otherwise quite inaccessible from that quarter. This road in our author's opinion, is undoubtedly the work of art, and the vitrified matter on the top is the only thing which indicates the effect of fire: there being neither an appearance of pumice stone, lava, nor basalt about the hill otherwise. There is indeed plenty of plum-pudding stone; which

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† *Edin. Phil. Transact.*
vol. ii. class
ii. art. 11.

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which some have supposed to be of the nature of volcanic tufa; but this opinion is rejected by our author as erroneous. "But the circumstance (says he) which in my apprehension evinces, in the most satisfactory manner, that these appearances of the effect of fire on the summit of this hill are not the operation of nature but of art, is the regular order and disposition of those materials, the form of the ground, and the various traces of skill and contrivance which are yet discernible, though considerably defaced either by external violence or the obliterating hand of time." To investigate this matter regularly, he begins with the winding road already mentioned, and which is evidently cut through the rock for the purpose of gaining an easy ascent from the level ridge to the summit, which would otherwise have been impracticable. In ascending by this road, there appears towards the middle, on the right hand, a small platform overhanging the passage, and inclining by a very gentle declivity to the very edge of the rock. Four enormous stones are placed upon the platform, and on the edge and extremity of it, which have evidently been guided by art into to that position: it being impossible that they could have rested there, had they been rolled down from the higher parts. The obvious reason for placing them in such a position has been, that on an alarm of danger they might be projected into the path below, which could be done by the efforts of a very few men; and when this was done, the passage would be entirely obstructed, or at least rendered so difficult that it could be defended by a few against any number of assailants. Some other large stones are placed on an eminence to the left, probably with a view to block up an hollow channel, by which an enemy might have attempted to ascend. When we come to the top of the hill, a few feet below the rampart which crowns the whole, there appears an outward wall approaching on the sides of the hill so near the upper rampart, as to have only a trench of 10 or 12 feet wide between them. This outward wall is in some places so low as to be almost level with the rock, though in other places it rises to the height of two or three feet; but even where lowest, it may be traced by a line of vitrified matter sticking fast to the rock all along, and nearly of the same breadth, which is about nine feet. The remains of this wall are strongly vitrified, except in one place on the north side, where, for about 70 yards, the rampart is formed only of dry stones and earth. At the east side, where the hill is more accessible, there is a prodigious mound of vitrified matter, extending itself to the thickness of above 40 feet. At the south-east corner and adjoining to this immense mound, is an outwork, consisting of two semicircular vitrified walls with a narrow pass cut through them in the middle: which appears to have been another, and perhaps the principal, entry to the fort.

The inner wall, surrounding the summit of the hill, incloses an oblong level area of about 75 yards long and 30 broad, rounded at each of the ends like the outward wall. It is of considerable height, and nearly of the same thickness with the outward one.—It has some appearance of having been defended with four turrets or bastions: but the traces are so imperfect, that Mr Tytler does not lay much stress on his observations in this respect; a number of small tumuli

of earth with a stone in the centre, were more discernible. On the east side a portion of the internal space appears separated from the rest by two ranges of stones fixed strongly in the earth, and forming a right-angled parallelogram. "This separation (says our author) is immediately discernible by the eye, from this circumstance that the whole of the inclosed summit has been most carefully cleared from stones, of which there is not one to be seen, unless those that form this division, and the single one in the middle of the circle of tumuli abovementioned. What has been the design of this separated space, it is difficult to conjecture. It might perhaps have marked the residence of those of a higher rank, or served as a temple for the purposes of devotion." On the east end of the large area on the summit is a well of about six feet in diameter, which has probably been sunk very deep in the rock, though now it is filled up with rubbish to within a yard of the top.

The other fortified hills mentioned by Mr Cardonnel are those of Dun-Evan in the shire of Nairn; Tor-dun castle, near fort Augustus; and another on the west side of Gleneves in Lochaber, three miles to the south of Fort William. The Castle-hill of Finhaven, in the county of Angus, has likewise some considerable ruins of the same kind.

Dun-Evan and the hill of Finhaven have likewise been visited by Mr Tytler, who gives an account of them in the paper already quoted; of which the following is an abstract. "On the summit of the hill of Dun-Evan, whose name implies that it had been originally a place of defence, are the remains of two walls surrounding an oblong space like that of Craig-Phadrick already described, but somewhat smaller in size. [Mr Cardonnel says that it is about 70 paces long and 30 broad]. There are likewise the traces of a well in the inclosed area; and at the east end are the remains of a prodigious mass of building, much more extensive than that on Craig-Phadrick." Here, however, our author could not perceive any marks of fire; and Mr Williams owns that the vitrified ruins here are more wasted than on Knockfarril or Craig-Phadrick. But with regard to the vitrifications here, our author is inclined to suppose Mr Williams to have been entirely in a mistake. On the Castle-hill of Finhaven, however, the vitrified remains are very visible all round the summit, which is cleared of stones and levelled, unless at one end, where there is a great hollow space separated from the rest of the area, and probably destined exclusively for the keeping of cattle. The inclosed area is about 140 yards long and upwards of 40 broad.

Besides these fortifications, the hill of Noth affords a remarkable appearance of the same kind: of which Mr Cordiner gives the following description, not from his own observation, but those of a gentleman of credit who visited the place. "On the top of the hill there is an oblong hollow, as I could guess, of about an English acre, covered with a fine sward of grass: in the middle toward the east end of this hollow is a large and deep well. The hollow is surrounded on all sides with a thick rampart of stones. On three sides of this rampart, from 8 to 12 feet thick, is one compact body of stones and minerals which have been in a state of fusion, resembling a mixture of stone and iron

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iron-ore, all vitrified, calcined, and incorporated. On the north side, the rampart consists of broken pieces of rock, which have the appearance of having been torn to pieces by some extraordinary violence. If the calcined compact wall exists under them, it is not at present visible."

Such are the descriptions of the most remarkable of these curious fortifications, which of late seem to have engaged the attention of the learned in a considerable degree. We have already taken notice, that by some they are supposed to be the works of art, by others the productions of a volcano. Mr Cardonnel adopts the opinion of Mr Williams as the most probable, both with respect to their use and manner of construction. Mr Tytler takes notice of the remarkable difference of opinion among those who have viewed the places in question. "It is curious to remark (says he) how the same appearances, to different observers, lead to the most opposite opinions and conclusions. The two gentlemen abovementioned (Mr Williams and Dr Anderson), seem not to have entertained the smallest doubt, that the vitrified materials on the tops of these hills were the vestiges of works of art, and the remains of structures reared for the purposes of security and defence. The bishop of Derry, when on the tour to the north of Scotland, visited the hill of Craig-Phadrack near Inverness, and expressed his opinion, that the mounds of vitrified matter were not the remains of any artificial work, but the traces of an ancient volcano. In the Phil. Trans. of the Royal Society of London for 1777, Part II. n^o 20. is an account of *Creck Paterick*, there termed a *Volcanic hill near Inverness*, in a letter from Thomas West, Esq; to Mr Law, F. R. S. in which the writer does not hesitate to pronounce this hill an extinguished volcano: and having sent specimens of the burnt matter for the inspection of the Royal Society, the secretary subjoins a note to the paper, intimating, that these specimens having been examined by some of the members well acquainted with volcanic production, were by them judged to be real lava. Such was likewise the opinion of the late Andrew Crossbie, Esq; who, in an account which he gave to the Philosophical Society of Edinburgh in 1780, offered some very curious conjectures with regard to the process of nature, by which he supposed the whole of this hill to have been thrown up from the bottom of the sea by the operation of intestine fire.

Mr Tytler agrees with those who think the vitrified structures to be artificial works: but he differs from Mr Williams and others, who think that they were vitrified on purpose for cementing the materials together. His reason for this is, that the number of forts that show marks of vitrification is inconsiderable when compared with those that do not. He therefore considers the vitrification as accidental; and that it must have been accomplished in the following manner. In the rude state in which we must suppose Scotland to have been in early times, is very probable that their buildings, both for habitation and defence, would be frequently constructed of loose stones of an irregular shape; of which, by themselves, it would scarce be possible to fabricate a wall of any tolerable strength. Hence it became necessary to use wood as well as stone in their construction. This kind of building then, in our au-

thor's opinion, was begun by raising a double row of palisades or strong stakes in the form of the intended structure in the same way as in that ancient mode of building described by Palladio under the name of *riempita a cassa*, or coffer-work. These stakes were probably warped across by boughs of trees laid very closely together, so as to form two fences running parallel to each other at the distance of some feet, and so close as to confine all the materials of whatever size that were thrown in between them. Into this intermediate space Mr Tytler supposes were thrown boughs and trunks of trees, earth and stones of all sizes, large or small as they could quarry or collect them. Very little care would be necessary in the disposition of these materials, as the outward fence would keep the mound in form. In this way it is easy to conceive that a very strong bulwark might be reared with great dispatch; which, joined to the natural advantage of a very inaccessible situation, and that improved by artful contrivances for increasing the difficulty of access, would form a structure capable of answering every purpose of security or defence. The most formidable attack against such a building would be fire, which would no doubt be always attempted, and often with success, by an enemy who undertook the siege. If the besiegers prevailed in gaining an approach to the ramparts, and, surrounding the external wall, set fire to it in several places, the conflagration must speedily have become universal, and the effect may be easily imagined. If there happened to be any wind at the time to increase the heat, the stony parts could not fail to come into fusion; and as the wood burnt away, sinking by their own weight into a solid mass, there would remain a wreck of vitrified matter tracking the spot where the ancient rampart had stood; irregular and of unequal height, from the fortuitous and unequal distribution of the stony materials of which it had been composed. This conjecture appears very probable from their appearance at this day. They do not seem to have ever been much higher than they are at present, as the fragments that have fallen from them, even where the wall is lowest, are very inconsiderable. The durable nature of the materials would prevent them from suffering any changes by time; though, from the gradual increase of the soil, they must in some places have lost considerably of their apparent height, and in others been quite covered. Mr Williams, in making a cut through the ramparts at Knockfarril, found in many places the vitrified matter covered with peat-moss half a foot thick.

In confirmation of this opinion, our author likewise urges, that in the fortification on Craig-Phadrack, a large portion of the outward rampart bears no marks of vitrification. The reason of this seems to be, that the steepness of the hill on that side renders a low fence of stones and turf sufficient; and no wood had probably been employed in its construction. "It appears therefore highly probable (concludes our author), that the effect of fire upon these hill-fortifications has been entirely accidental; or, to speak more properly, that fire has been employed not in the construction, but towards the demolition of such buildings: and for the latter purpose it would certainly prove much more efficacious than for the former. It is much to be doubted, whether it would be at all possible, even in the present

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sent day, by the utmost combination of labour and of skill, to surround a large space of ground with a double rampart of stones compacted by fire, of such height and solidity as to answer any purpose of security or defence against an enemy. Any structure of this kind must have been irregular, low, fragile, easily scaled, and quite insecure; a much weaker rampart, in short, than a simple wall of turf or wooden palisade. The vestiges yet remaining, as I have already observed, give no room to suppose that the vitrified mound has ever been much more entire than it is at present. The effect of fire upon structures reared in the manner I have supposed them to have been, will account most perfectly for their present appearance. It was from necessity that the builders of these fortifications betook themselves to a mode of structure so liable to be destroyed by fire. In those parts where stones could be easily quarried, of such size and form as to rear a rampart by themselves of sufficient strength and solidity, there was no occasion to employ wood or turf in its construction; and it was therefore proof against all assaults by fire. Such are the ramparts which appear on the hill of Dun-Jardel, Dun-Evan, and many others, on which there is not the smallest appearance of vitrification. But on Craig Phadrick, and the other hills above described, where, from the nature of the rock, the stones could be procured only in irregular and generally small fragments, it was necessary to employ some such mode of construction as I have supposed; and these ramparts, though solid and well calculated for defence against every attack by force or stratagem, were not proof against an assault by fire."

Mr Cordiner is of opinion, that the vitrifications in question cannot have been the works of art, and ridicules the contrary hypothesis; though without adducing any argument against it. The hill of Noth is by him supposed to have been a volcano. He describes it as "a most majestic mountain, in general brown, with moss and heath, interspersed with bare rock, in many places crumbling down. The highest part of it is a circular hill, whose verdure, as well as height, distinguishes it from the rest of the mountain. This is called the *Top of Noth*; and bears the strongest resemblance to every description of a volcanic mount. At the distance of many miles, one can distinguish those ridges which are the boundaries of the crater, indicating the hollow in the top." The gentleman from whom Mr Cordiner received the account of the vitrifications on the summit, informs us, that on first seeing specimens of them, he imagined that they had been pieces of stone calcined by the burning down of a castle; as he had found something very like them on the castle-hill at Cullen, in parts where the sward of grass was broken: but on reaching the top, and viewing the appearances on it already described, he altered his opinion. "That men hardly-beset (says he) might climb up with some provisions to this as a place of refuge, is probable: but that, on a barren mountain-top, far from cultivated ground, half a day's journey from the plain; that there, in any period of society, man should have been tempted to build that amazing rampart, is not to be imagined: they have found it a natural and extensive fortress, and in critical circumstances have made use of it accordingly. That it has been occupied as a place of strength and of refuge, is

very evident; for, some hundred yards lower down on the hill, there are the remains of another rampart or wall, consisting of loose stones piled together without any cement, carried quite round the hill. This last has been built for an additional defence to those who made their abode on the top. The top of Noth, for two-thirds downwards, is covered with a green sward; below that, it is brown with heath: this is the very reverse of the adjacent mountains; and the greater verdure of the upper part I imputed to a new soil created by the ashes of the volcano. The opening, called a *well*, I suppose to have been the latest crater. About a mile south, down towards the lower grounds of the *Cabrock*, there is a very pretty regular green hill; which I ascribe to a later eruption than those which may have formed the contiguous hills now covered with heath. There is an extraordinary luxuriant spring of water rushes out at once from the sides of the hill of Noth; which is likewise some confirmation of the opinion that a volcano has some time existed there, which has occasioned great hollows and reservoirs of water in the heart of the mountain. And the wild irregularities of nature through all the *Cabrock*, the hideous and strange projection of rocks from the sides of the hills, would seem to indicate some vast convulsions which the earth must have suffered in these parts.

"The traces of ancient volcanoes (says Mr Cordiner) are far from being unfrequent in Scotland. The hill of Finhaven is one instance; and not only abundant in this species of lava, but with *tarras*, or the *pulvis puteolanus*, an *amalgama*, as Condamine calls it of calcined stones mixed with scorias and iron-rust reduced to powder. The hill of Beregonium, near Dunstaffage castle, is another, yielding vast quantities of pumices or scoria of different kinds; many of which are of the same species with those of the volcanic Iceland. The noble assemblage of basaltic columns at Staffa, those in the Isle of Sky, and the rock Humble, are but so many evidences of the ancient volcanoes of this country. And finally, the immense stratum of *pumex vitreus* or Iceland agate, on the hill of Dun-suin in Arran, is the last proof I shall bring in support of the question."

On this dispute we can only observe, that whatever side we embrace, the difficulties seem to be very great, nay almost insurmountable. When we consider the great thickness of the walls on the top of Noth, from 8 to 12 feet, and the vast mound of vitrified matter, no less than 40 feet in breadth, mentioned by Mr Tytler, we can scarce conceive it possible that less than a volcanic fire could be able to form them. We may easily allow, that, in the way this gentleman mentions, there might be considerable vitrifications formed; but that such immense masses should be brought into perfect fusion by the small quantity of fuel which could be put round them in palisades, or intermixed with the materials themselves, will be incredible to every one acquainted with the extreme difficulty with which stones of any magnitude are brought into complete fusion. We see even in the insides of furnaces, though sometimes built of no more unfusible materials than common brick, no such effects follow. There is a slight vitrification indeed, but it scarce ever penetrates to the depth of an inch or two, though very violent fires are kept

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kept up for a much longer time than we could suppose the wood surrounding those walls to require for its being consumed. In conflagrations, where houses are consumed, which are the only similar examples we have, no such effect is perceived. Even in the great fire at London in 1666, where so many buildings were destroyed, we do not hear of their walls being vitrified, though the materials of many of them were undoubtedly as fusible as the rocks and stones of Craig-Phadrick, or the Top of Noth. If, on the other hand, we reject this, and adhere to the volcanic hypothesis, our difficulties are equally great. For where shall we find in any other part of the world an example of volcanoes ejecting lava in the form of walls inclosing a regular area? This would be attributing such a singularity to the volcanoes of Scotland as the most extravagant imagination cannot admit. We must therefore conclude, that though these ruins are certainly the works of art we have not yet sufficient data to decide the question with respect to their construction, but that the subject requires a further investigation.

In the paper already quoted, Mr Tytler observes, that "these ancient fortifications present a more curious and interesting object of speculation, than those uncertain and indeed fruitless conjectures as to the mode in which they have been reared." This, he justly observes, must have been before the use of mortar was known; for as the country aboundeth in limestone, and the builders certainly would exert all their powers in giving them a proper degree of strength, it would undoubtedly have been used. Hence we are led to ascribe to these a very considerable degree of antiquity; for as the Britons were taught the use of mortar by the Romans, it is probable that we must date the origin of the structures in question before the time of the invasion of that people, or at least soon after it: so that we must look upon them to be more than 1650 years old; but how far beyond that period we are to search for their origin, does not appear. "All that we can conclude with certainty (says our author), is, that they belong to a period of extreme barbarism. They must have been constructed by a people scarcely removed from the state of savages, who lived under no impression of fixed or regulated property in land; whose only appropriated goods were their cattle; and whose sole security, in a life of constant depredation, was the retreat to the summits of those hills of difficult access, which they had fortified in the best manner they could. As the space inclosed was incapable of containing a great number of men, especially if occupied in part by cattle, it is presumable, that these retreats were formed chiefly for the security of the women and children of the canton and of their herds. They could be defended by a few men, while the rest of the tribe were engaged with their enemies in the field."

Our author concludes his dissertation with a conjecture, which indeed seems well supported, that the forts in question were constructed, not only before the Roman invasion, but before the introduction of the rites of the Druids into Britain; as "there appears no probability that the inhabitants either lived under such a government as we know to have prevailed under the influence of the Druids, or had any acquaintance with those arts which it is certain they cultivated."

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FORTALICE, in Scots law, signified anciently a small place of strength, originally built for the defence of the country; and which, on that account, was formerly reckoned *inter regalia*, and did not go along with the lands upon which it was situated without a special grant from the crown. Now, fortalices are carried by a general grant of the lands; and the word is become synonymous with manor-place, messuage, &c.

FORTESCUE (Sir John), lord chief justice of the king's bench, and lord high chancellor of England, in the reign of king Henry VI. was descended from the ancient family of Fortescue, in the county of Devon. He studied the municipal laws of England in Lincoln's Inn, of which he was made one of the governor's in the fourth and seventh years of the reign of king Henry VI. In 1430 he was called to the degree of a serjeant at law, and in 1441 was constituted the king's serjeant. The following year he was made lord chief justice of the king's bench; in which honourable station he continued till near the end of that king's reign, who showed him many particular marks of his favour, and advanced him to the post of lord high chancellor of England. During the reign of king Edward IV. he followed the fortunes of the house of Lancaster, and was many years in exile with queen Margaret and prince Edward her son. At length, they having a prospect of retrieving their desperate fortunes, the queen and prince returned to England, and Sir John Fortescue, with many others, accompanied them: but soon after the decisive battle of Tewksbury, he was thrown into prison and attainted, with other Lancastrians; but found means to procure his pardon from Edward IV. He wrote, 1. A learned commentary on the politic laws of England, for the use of prince Edward; to one edition of which Mr Selden wrote notes. 2. The difference between an absolute and limited monarchy, as it more particularly regards the English constitution (which was published, with some remarks, by John Fortescue, afterwards lord Fortescue, in 8vo. in 1714; and a second edition was published, with amendments, in 1719): And several works, which still remain in manuscript. He died near 90 years of age; and was buried in the parish church of Ebburton, where a monument was erected to his memory, in 1677, by one of his descendants.

FORTH, one of the most noble and commodious rivers in Scotland. It takes its rise near the bottom of Lomond hills; and running from west to east, receives in its passage many considerable streams, deriving their waters from the eminences in the midland counties of North Britain. Between Stirling and Alloa, the Forth winds in a most beautiful and surprising manner; so that, though it is but four miles by land, it is 24 by water between those two places. Below Alloa the river expands itself to a great breadth between the counties of Lothian and Fife, till at Queen's-ferry it is contracted by promontories shooting into it from both coasts; so that, from being four or five, there it is not above two miles broad. In the middle of the channel lies a small island called *Inchgarvy*, which has a spring of fresh water: upon the island there is an ancient fort, which has been lately repaired; and if there were either forts or blockhouses on the opposite promontories, that part of the river which lies between Alloa and Queen's-ferry would be as secure and convenient

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venient a harbour as could be desired. A little below this, near the north shore, lies Inchcomb, on which are the remains of an ancient monastery of considerable extent; and opposite to Leith stands the island of Inchkeith, formerly fortified, but now in ruins. Below Queen's-ferry the north and south shores receding, the body of the water gradually enlarges till it becomes two or three leagues broad, affording several safe harbours on both sides, and excellent roads throughout, unembarrassed with latent rocks, shoals, or sands; and allowing secure anchorage to the largest ships within a league of the coast in almost any part of the Frith, and to vessels of a smaller size within a mile or less. The Firth, or (as it is commonly written) the *Frith*, of Forth, is, at the mouth of it, from North Berwick to Fifeness, full five leagues broad; having the little island of May (on which there is a light-house, and there might also be a fort) in the middle of it, and to the west of this, the rocky island of Bass; notwithstanding which, the largest fleet may enter and sail up it many miles with the utmost facility and in the greatest safety. In 1781, Admiral Parker's fleet lay some weeks opposite to Edinburgh, accompanied by 500 sail of merchantmen, the whole in full view of the city and castle.

* View of
the British
Empire, vol.
ii. p. 518:

The Forth was known to the ancients by the name of *Bodotria*, or (as Ptolemy calls it) *Boderia*, and has been ever famous for the number of its havens; some of which are, indeed, in their present condition, scarce worthy of that name. It is navigable for merchantmen, as high as Alloa, 50 miles from the sea; and for coasters as far as Stirling, 24 miles further by water, though only four by land in a direct line, as already observed. The tide flows only a full mile above Stirling to a place called *Craigforth*, where the proprietor intercepts the passage of the salmon by a cruiue or weir, very injurious to the large tract of country, which stretches as far as Lomond westward. The river from Stirling to the bridge of Aberfoil, at the entrance into the West-Highlands, is only passable for man or horse at few places, and these in dry seasons. It glides gently thro' a dead flat, from Gartmore eastward; "and on these accounts (says Mr Knox*) it might be made navigable for barges, at a trifling expence to the proprietors of the lands, an improvement much wanted in a rich, extensive, and populous valley, without market towns, coal and lime. Supposing this work to be executed, of which there is some probability, the whole extent of

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navigation on the Forth, will, including all its windings, exceed 200 miles, through a coast of nearly 100 miles; fertile, populous, industrious; and from Stirling eastward, almost lined with towns, anciently the seats of commerce and navigation, till they were ruined by the English depredations; in which miserable state, some of them still remain, while others begin to resume the appearance of business. The principal object of these towns was the fisheries, which they prosecuted with great vigour as far as Iceland, till the time of the Union, from which period the eastern fisheries gradually dwindled away; and the poor fishermen, unable to subsist themselves upon air and water, took up the trade of smuggling; but so soon as the fishery laws shall be amended, the salt duties abolished, and an adequate bounty extended to boats as well as busses, these people will readily fall into the track of their ancestors, live by honest industry, and add new vigour to our naval strength. Many of the ports are nearly choaked up, others want repairs, which neither the individuals nor the corporations of those decayed places can accomplish. Though the harbours on the Forth are in general small, the depth of water might be made sufficient for vessels of 200 tons burden, which fully answers the purposes of their coasting and Baltic trade; but to obtain this, or even a less depth of water, an aid of 50,000*l.* would be requisite."

By this river and the Clyde, Scotland is almost divided into two parts. The Forth falls into the east sea below Edinburgh, and has an easy communication with the whole eastern coast of Great-Britain; with France, Ostend, Holland, Hamburgh, Prussia, Dantzic, Russia, Sweden, Denmark, Norway, and Greenland. The Clyde falls into the Atlantic ocean below Glasgow, and communicates with the western coast of Great Britain; with Ireland, the south of France, Portugal, Spain, the Mediterranean, America, and the West-Indies. These two rivers, thus falling in opposite directions into the two seas which environ the island, and the neck of land between them, amounting scarcely to 24 miles, gave rise to the idea of a junction, so as to open a communication across the kingdom, and thereby cut off the long dangerous navigation by the Land's End and the Pentland Frith: an object of vast utility, and which has lately been happily accomplished. See the article CANAL.

F O R T I F I C A T I O N ;

THE art of fortifying a town or other place; or of putting them in such a posture of defence, that every one of its parts defends, and is defended by, some other parts, by means of ramparts, parapets, moats, and other bulwarks; to the end that a small number of men within may be able to defend themselves for a considerable time against the assaults of a numerous army without, so that the enemy in attacking them must of necessity suffer great loss.

The origin and rise of fortification is undoubtedly owing to the degeneracy of mankind. In the first ages of the world, men were dispersed up and down the

countries in separate families, as we are told in the histories of the Jews and Scythians, who wandered from one place to another, for the sake of finding pasture for their cattle. These families became in time so numerous as to form large communities, which settled all together in a place; from whence villages and towns had their origin and rise: but they found it was necessary, for the common security, to surround those towns with walls and ditches, to prevent all violences from their neighbours, and sudden surprises. This was sufficient for some time, till offensive weapons were invented, and conquering became a fashion. Then walls with

with loop-holes were made at proper distances, in order to screen the defenders against the arrows of the assailants: but finding that, as soon as the enemy got once close to the walls, they could from no part be discovered or repulsed; for this reason they added square towers at proper distances from each other, so that every part of the wall might be defended by the adjacent sides of the towers. However, this manner of inclosing of towns was found to be imperfect, because there remained still one of the faces of the towers which fronted the field that could not be seen from any other part, and therefore could not be defended. To remedy this, they made the towers round instead of square, imagining this figure to be the strongest to resist the battering engines, as likewise to be better defended from the other parts of the wall.

Notwithstanding the superiority of this method above the former, there remained yet a part of these towers unseen and incapable of being defended; which made them change the figure of the towers again; that is, they made them square as before; but, instead of presenting a face to the field as formerly, they presented an angle; by this means they effectually found out such a disposition of their works, that no part could be attacked without being seen or defended by some other part.

This last method was used a long while; and would in all probability have continued to this day, if gun-powder had not been found out: but the violence of the guns and mortars soon convinced the world, that such towers and walls were but a weak defence against these thundering engines; and besides, as the nature of the attack was entirely changed, it was also necessary to change that of fortifying likewise.

From that time ramparts were added to the walls, the towers enlarged into bastions, and all sorts of out-works have been added, such as ravelins, counter-guards, horn and crown works, and others of the like nature, in order to render the defence in some measure equivalent to the attack.

Notwithstanding all the improvements which have been made in the art of fortifying since the invention of gun-powder, that of attacking is still superior to it: engineers have tried in vain to render the advantages of a fortification equal to those of the attack; the superiority of the besiegers fire, together with the greater number of men, obliges generally, sooner or latter, the besieged to submit.

The greatest improvement made in the art of attacking happened in the year 1697, when M. Vauban made first use of ricochet-firing at the siege of Ath, whereby the besieged placed behind the parapets were as much exposed to the fire of the besiegers as if there had been none; whereas, before, they had been secure as long as the parapet was not demolished; and the worst is, that there can be no remedy found to prevent this enfilading, without falling into inconveniences almost as bad as those which we endeavour to avoid.

FORTIFICATION is either regular or irregular. *Regular* fortification, is that built in a regular polygon, the sides and angles of which are all equal, being commonly about a musket-shot from each other. *Irregular* fortification, on the contrary, is that where the sides and angles are not uniform, equidistant, or equal;

which is owing to the irregularity of the ground, valleys, rivers, hills, and the like.

SECT. I. Of Regular Fortification.

ALTHOUGH authors agree as to the general form in the present manner of fortifying, yet they mostly differ in particular constructions of the parts. As it would be both needless and superfluous to treat of all the different methods hitherto proposed, we shall content ourselves with explaining those only which are most esteemed by the best judges, and have been mostly put in practice.

Construction of M. VAUBAN'S Method.

This method is divided into little, mean, and great; the *little* is chiefly used in the construction of citadels, the *mean* is that of all sorts of towns, and the *great* in particular cases only.

We shall give the construction of the mean, as being most useful; and refer the reader to the table hereafter, for those dimensions which are different in these several fortifications.

Plate
CXCVII.

Inscribe in a circle a polygon of as many sides as the fortification is designed to have fronts; let AB be one of the sides of half an hexagon, which bisect by the perpendicular CD; divide half AC of it into nine equal parts, and one of these into ten others; then these divisions will serve as a scale to construct all the parts of the fortification, and each of them is supposed to be a toise or fathom, that is, six French feet; and therefore the whole side AB is supposed to be 180 toises.

As the dividing a line into so many equal parts is troublesome and tedious; it is more convenient to have a scale of equal parts by which the works may be constructed.

If therefore, in this case, the radius is taken equal to 180 toises, and the circle described with that radius being divided into six equal parts, or the radius being carried six times round, you will have an hexagon inscribed; AB being bisected by the perpendicular CD as before, set off 30 toises from C to D, and draw the indefinite lines ADG, BDF; in which take the parts AE, BH, each equal to 50 toises; from the centre E describe an arc through the point H, meeting AD in G, and from the centre H describe an arc through the point E, meeting BD in F; or which is the same, make each of the lines EG, HF, equal to the distance EH; then the lines joining the points A, E, F, G, H, B, will be the principal or outline of the front.

If the same construction be performed on the other side of the polygon, you will have the principal or outline of the whole fortification.

If, with a radius of 20 toises, there be described circular arcs, from the angular points B, A, M, T, and lines are drawn from the opposite angles E, H, &c. so as to touch these arcs, their parts *ab*, *bc*, &c. together with these arcs, will represent the outline of the ditch.

DEFINITIONS.

1. The part FEALN, is called the bastion.
2. AE, AL, the faces of the bastion.
3. EF, LN, the flanks.
4. FG; the curtain.

Of
Orillons.
Plate
CXC VII.

5. FN, the gorge of the bastion.
 6. AG, BF, the lines of defence.
 7. AB, the exterior side of the polygon.
 8. CD, the perpendicular.
 9. Any line which divides a work into two equal parts, is called the capital of that work.
 10. *abc*, the counterscarp of the ditch.
 11. A, M, the flanked angles.
 12. H, E, L, the angles of the shoulder, or shoulder only.
 13. G, F, N, the angles of the flank.
 14. Any angle whose point turns from the place is called a *salient angle*, such as A, M; and any angle whose point turns towards the place, *re-entering angle*, such as b, F, N.
 15. If there be drawn two lines parallel to the principal or outline, the one at 3 toises distance, and the other at 8 from it; then the space *yx* included between the principal one and that farthest distant, is called the *rampart*.
- And the space *xx*, contained by the principal line, and that near to it, and which is generally stained black, is called the *parapet*.

16. There is a fine line drawn within four feet of the parapet, which expresses a step called *banquette*.

N. B. All works have a parapet of three toises thick, and a rampart from 8 to 10, besides their slopes. The rampart is elevated more or less above the level of the place, from 10 to 20 feet, according to the nature of the ground and the particular constructions of engineers.

The parapet is a part of the rampart elevated from 6 to 7½ feet above the rest, in order to cover the troops which are drawn up there from the fire of the enemy in a siege; and the banquette is two or three feet higher than the rampart, or about four feet lower than the parapet; so that when the troops stand upon it, they may just be able to fire over the parapet.

17. The body of the place, is all that which is contained within this first rampart: for which reason, it is often said to construct the body of the place; which means properly, the construction of the bastions and curtains.

18. All the works which are constructed beyond the ditch before the body of the place are called *out-works*.

Of
Ravelins.
late
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T A B L E.

	Forts.						Little Fortif.				Mean.		Great.	
Side of Polyg.	80	90	100	110	120	130	140	150	160	170	180	190	200	260
Perpendicular.	10	11	12	14	15	16	20	21	23	25	30	31	35	22
Faces bait.	22	25	28	30	33	35	40	42	45	47	50	53	55	60
Cap. of rav.	25	28	30	35	38	40	45	50	50	52	55	55	60	50

In the first vertical column are the numbers expressing the lengths of the exterior sides from 80 to 260. In the second, the perpendiculars answering to these sides. In the third, the lengths of the faces of bastions; and in the fourth, the lengths of the capitals of the ravelins.

The forts are mostly, if not always, square: for which reason the perpendiculars are made one-eighth of the exterior sides; because if they were more, the gorges of the bastions would become too narrow.

The little fortification is chiefly designed for citadels, and are commonly pentagons; the perpendiculars are made one-seventh of the exterior side: the mean is used in all kinds of fortifications from an hexagon upwards to any number of sides: and the great is seldom used but in an irregular fortification, where there are some sides that cannot be made less without much expence; or in a town which lies near a great river, where the side next the river is made from 200 to 260 toises; and as that side is less exposed to be attacked than any other, the perpendicular is made shorter, which saves much expence.

The faces of the bastions are all ¾ths of the exterior sides, or nearly so, because the fractions are neglected.

It may be observed in general, that in all squares the perpendicular is ¼th of the exterior side, and all pentagons ⅓th, and in all the rest upward ½th.

1. Construction of Orillons and retired Flanks.

DESCRIBE the front MPQRST as before, and divide the flank into three equal parts, of which suppose

Sr to be one; from the opposite flanked angle M draw a line Mr, in which take the part *mr* of 5 toises; take likewise Rn in the line of defence MR, produced, equal to 5 toises, and join *mn*, upon which as a base describe the equilateral triangle *npm*, and from the angle *p*, opposite to the base as centre, is described the circular flank *nm*.

And if Sr be bisected by the perpendicular 1, 2, and another be erected upon the face ST, at S; the intersection 2 of these two perpendiculars will be the centre of the arc which forms the orillon.

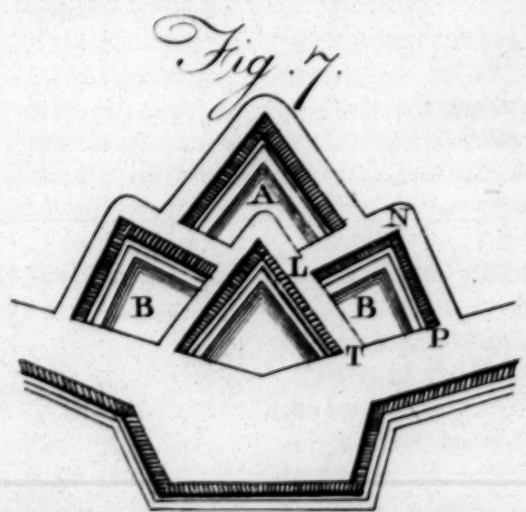
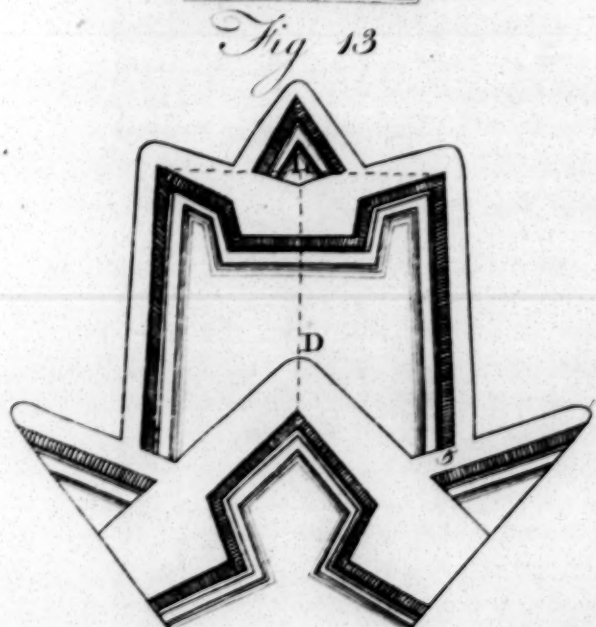
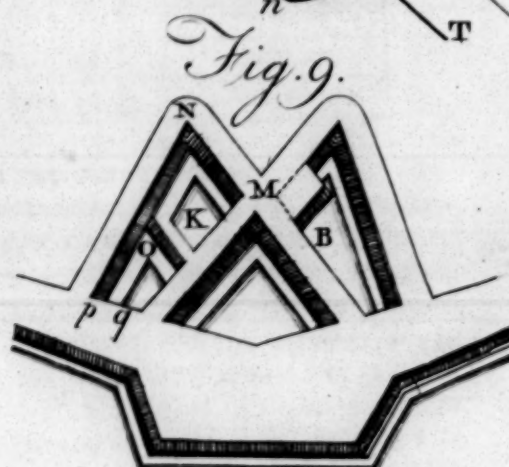
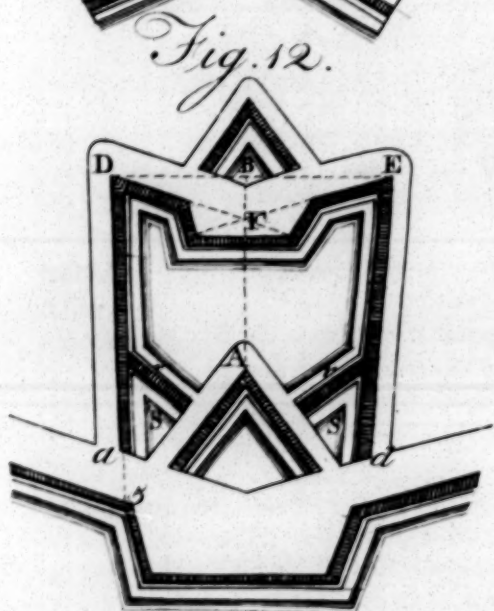
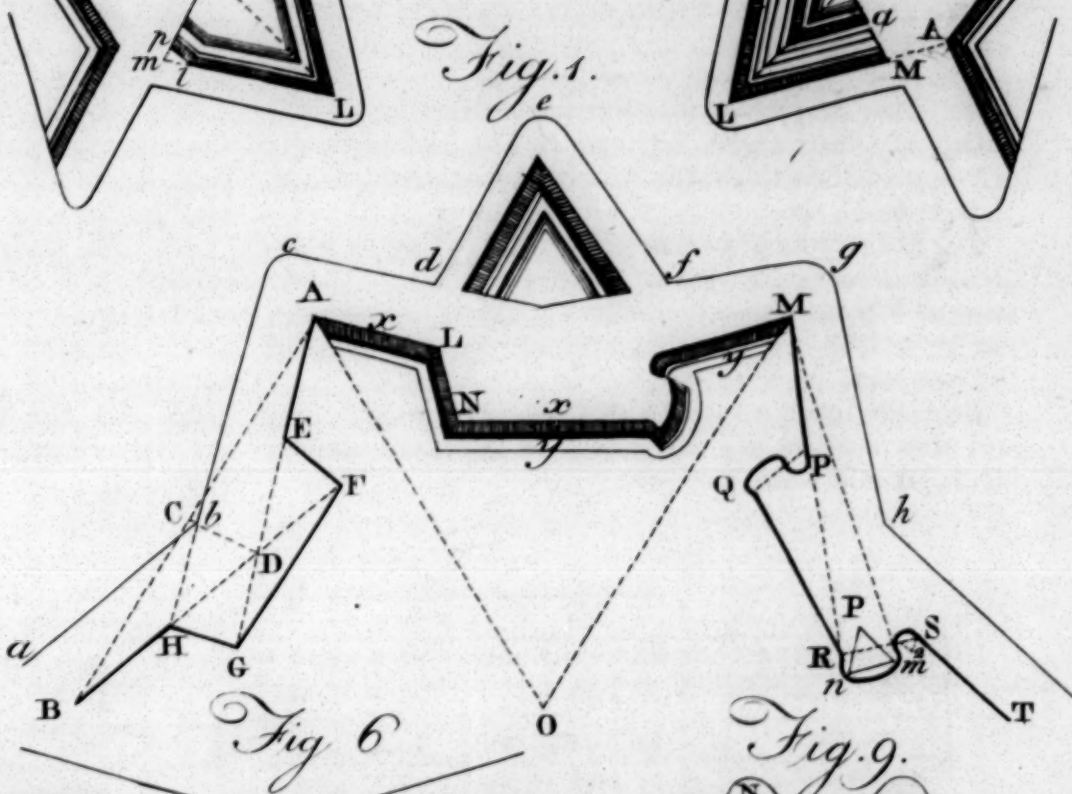
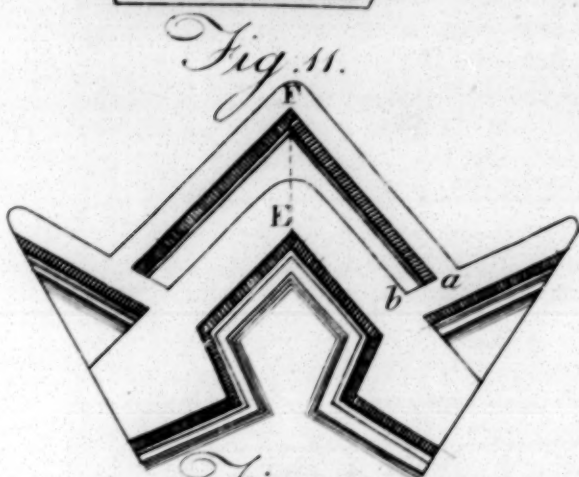
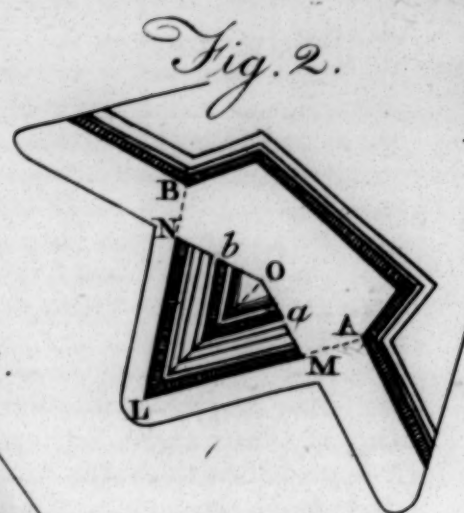
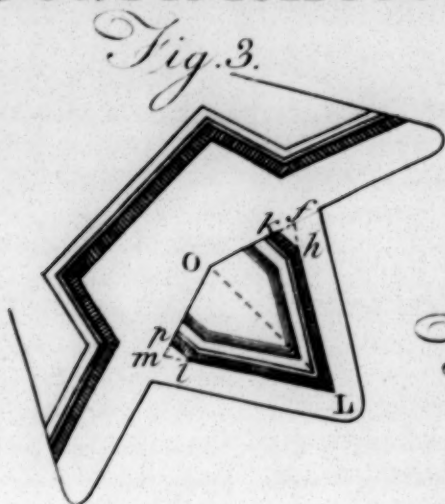
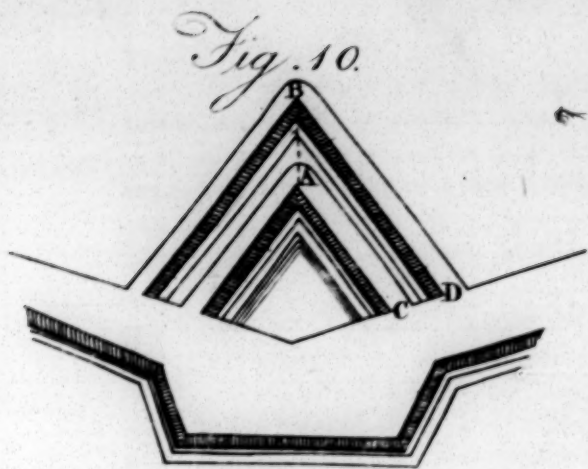
The orillons are very useful in covering the retired flanks, which cannot be seen but directly in the front; and as these orillons are round, they cannot be so easily destroyed as they would be if they were of any other figure.

2. Construction of Ravelins or Half Moons.

FIG. 2. Set off 55 toises, from the re-entering angle O of the counterscarp, on the capital OL or on the perpendicular produced, and from the point L draw lines to the shoulder AB; whose parts LM, LN, terminated by the counterscarp, will be the faces, and MO, ON, the semigorges of the ravelin required.

This is Mr Vauban's method of constructing ravelins, according to some authors: and others will have the faces of the ravelin terminate on those of the bastions within 3 toises of the shoulders; which seems to be the best way, for these ravelins cover the flanks much better than the others.

The ditch before the ravelin is 12 toises its counterscarp





Of
Tenailles.
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scarp parallel to the faces of the ravelins ; and is made in a circular arc, before the salient angle : as likewise all ditches are in general.

When the ravelins are made with flanks, as in fig. 3. the faces should terminate on those of the bastions, at least 5 toises from the shoulders.

The flanks are made by setting off 10 toises from the extremities of the faces, from *f* to *h*, and from *m* to *l* ; and from the points *b*, *l*, the flanks *h k*, *l p*, are drawn parallel to the capital LO of the ravelin.

There are sometimes redoubts made in the ravelin, such as in fig. 2. which is done by setting off 16 toises from the extremities of the faces on the semi-gorges from N to *b*, and from M to *a* ; and from the points *b*, *a*, the faces are drawn parallel to those of the ravelin : the ditch before the redoubt is 6 toises, and its counterscarp parallel to the faces.

3. Construction of Tenailles.

A tenaille is a work made in the ditch before the curtains, the parapet of which is only 2 or 3 feet higher than the level ground of the ravelin. There are three different sorts : the first are those as fig. 4. which are made in the direction of the lines of defence leaving a passage of 3 toises between their extremities and the flanks of the bastions, as likewise another of 2 in the middle for a bridge of communication to the ravelin.

The second sort are those as in fig. 5. Their faces are in the lines of defence, and 16 toises long, besides the passage of 3 toises between them and the flanks of the bastions ; their flanks are found by describing arcs from one shoulder of the tenaille as centre through the other, on which are set off 10 toises for the flanks desired.

And the third sort are those as in fig. 6. Their faces are 16 toises, as in the second sort, and the flanks are parallel to those of the bastions.

The use in general of tenailles, is to defend the bottom of the ditch by a grazing fire, as likewise the level ground of the ravelin, and especially the ditch before the redoubt within the ravelin, which can be defended from no where else so well as from them.

The first sort do not defend the ditch so well as the others, as being too oblique a defence : but as they are not subject to be enfiladed, M. Vauban has generally preferred them in the fortifying of places as may be seen in the citadel of Lille, at Laudau, New Brisac, and in a great many other places.

The second sort defend the ditch much better than the first, and add a low flank to those of the bastions ; but as these flanks are liable to be enfiladed they have not been much put in practice. This defect might however be remedied, by making them so as to be covered by the extremities of the parapets of the opposite ravelins, or by some other work.

As to the third sort, they have the same advantage as the second, and are likewise liable to the same objections ; for which reason, they may be used with the same precautions which have been mentioned in the second.

Tenailles are esteemed so necessary, that there is hardly any place fortified without them : and it is not without reason. For when the ditch is dry, the part

behind the tenailles serves as a place of arms, from which the troops may sally, destroy the works of the enemy in the ditch, oppose their descent, and retire with safety ; and the communication from the body of the place to the ravelin becomes easy and secure : which is a great advantage ; for by that means the ravelin may be a much better defence, as it can be supplied with troops and necessaries at any time. And if the ditch is wet, they serve as harbours for boats, which may carry out armed men to oppose the passage over the ditch whenever they please ; and the communication from the tenailles to the ravelin, becomes likewise much easier than it would be without them.

4. Construction of Lunettes.

FIG. 7. Lunettes are placed on both sides of the ravelin, such as B, to increase the strength of a place : they are constructed, by bisecting the faces of the ravelin with the perpendicular LN ; on which is set off 30 toises from the counterscarp of the ditch for one of its faces ; the other face, PN, is found by making the semi-george TP of 25 toises ; the ditch before the lunettes is 12 toises, the parapet 3, and the rampart 8, as in the ravelin.

There is sometimes another work made to cover the salient angle of the ravelin, such as A, called *bonnet*, whose faces are parallel to those of the ravelin, and when produced bisect those of the lunettes ; the ditch before it is 20 toises.

There are likewise lunettes, such as D in fig. 8. whose faces are drawn perpendicular to those of the ravelin, within a third part from the salient angle ; and their semi-gorges are only 10 toises.

These kind of works may make a good defence, and cost no very great expence ; for as they are so near the ravelin, the communication with it is very easy, and one cannot well be maintained till they are all three taken.

5. Construction of Tenaillons.

FIG. 9. Produce the faces of the ravelin beyond the counterscarp of the ditch, at a distance MN of 30 toises, and take on the counterscarp of the great ditch 15 toises from the re-entering angle *p* to *q*, and draw Nq, then q Nmp will be the tenailles required ; its ditch is 12 toises, that is, the same as that of the ravelin. Sometimes there is made a retired battery in the front of the tenaillons, as in B ; this battery is 10 toises from the front to which it is parallel, and 15 toises long.

There are commonly retrenchments made in the tenaillons, such as O ; their parapets are parallel to the fronts MN, and bisect the side q N ; the ditch before this retrenchment is 3 toises : and there is a banquette before the parapet next to the ditch of about 8 feet, called *berm* ; which serve, to prevent the earth of the parapet (which seldom has any revetment) from falling into the ditch.

It is to be observed, that the ravelin, before which tenaillons are constructed, must have its salient angle much greater than the former construction makes them ; otherwise the salient angles of the tenaillons become too acute ; for which reason we made the capital of this

Of
Lunettes,
&c.
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Of
Counter-
guards, &c.

this ravelin 45 toises, and the faces terminate within 3 toises of the shoulders.

6. Construction of Counterguards.

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CXC VII.

FIG. 10, 11. When the counterguard is placed before the ravelin, set off 40 toises on the capital of the ravelin from the salient angle A to the salient angle B, of the counterguard; and 10 from C to D, on the counterscarp of the ditch.

When the counterguard is before the bastion, such as in fig. 2. its salient angle F is 50 toises from the salient angle E of the bastion, and the breadth near the ditch of the ravelin 10 toises as before.

The ditch before the counterguards is 12 toises, and its counterscarp parallel to the faces.

Counterguards are made before the ravelin on some particular occasions only; but are frequently constructed before the bastions, as covering the flanks wonderfully well. Some authors, as Mr Blondel and Mr Coehorn, will have them much narrower than they are here.

Construction of Hornworks.

FIG. 12. Produce the capital of the ravelin beyond the salient angle A, at a distance AB; of about 80 toises; draw DBE at right angles to AB; in which take BD, BE, each equal to 55 toises; and on the exterior side DE, trace a front of a polygon in the same manner as that of the body of the place, making the perpendicular BF 10 toises, and the faces 30.

The branches D a, E b, of the hornwork, when produced, terminate on the faces of the bastions, within 5 toises of the shoulders. The ditch of the hornwork is 12 toises, and its counterscarp parallel to the branches; and in the front terminates at the shoulders, in the same manner as the great ditch before the bastions.

The capital of the ravelin before the front of the hornwork is 35 toises, and the faces terminate on the shoulders, or rather 2 or 3 toises beyond them: and the ditch before the ravelin is 8 toises.

There are sometimes retrenchments made within the hornwork, such as S, S; which are constructed by erecting perpendiculars to the faces of the ravelins, within 25 toises of their extremities. This retrenchment, like all others, has a parapet turfed only with a berm of 8 feet before it: as likewise a ditch from 3 to 5 toises broad.

Fig. 13. When a horn work is made before the bastion, the distance DL of the front from the salient angle of the bastion is 100 toises, and the branches terminate on the faces of the adjacent ravelins within 5 toises from their extremities; all the rest is the same as before.

1. Construction of Crown-works.

Plate
CXC VIII.

FROM the salient angle, A (fig. 1.) of the ravelin, as a centre, describe an arc of a circle with a radius of about 120 toises, cutting the capital of the ravelin, produced at C; from the point C, set off the cords CB, CF, each of them equal the 110 toises; and on each of which, as an exterior side, construct a front of a polygon of the same dimensions as in the hornwork that is, the perpendicular should be 81 toises, the faces

30, and the branches terminate on the faces of the bastions within 25 toises of the shoulders.

The ditch is 12 toises, the capital of the ravelin 35, and its ditch 8; that is the same as in the hornwork.

Sometimes the crownwork is made before the bastion, as in fig. 2. The arc is described from the salient angle A of the bastion, with a radius of 120 toises, as before; and the branches terminate on the faces of the adjacent ravelins within 25 toises of their extremities: the rest of the dimensions and constructions are the same as before.

Hornworks as well as crownworks, are never made but when a large spot of ground falls beyond the fortification, which might be advantageous to an enemy in a siege, or to cover some gate or entrance into a town.

9. Construction of Covert-ways and Glacis.

ALTHOUGH we have not hitherto mentioned the covert way nevertheless all fortifications whatsoever have one; for they are esteemed to be one of the most essential parts of a modern fortification; and it is certain, the taking the covert-way, when it is in a good condition and well defended, is generally the most bloody action of the siege.

After having constructed the body of the place and all the outworks which are thought necessary, lines are drawn parallel to the outmost counterscarp of the ditches, at 6 toises distant from it; and the space *mn*, *m n*, included between that line and the counterscarp will be the covert-way required.

Fig. 3. There is in every re-entering angle of the counterscarp a place of arms *m*; which is found by setting off 20 toises from the re-entering angle *a*, on both sides from *a* to *b*, and from *a* to *c*; and from the points *b*, *c*, as centres, arcs are described with a radius of 25 toises, so as to intersect each other in *d*; then the lines drawn from this intersection to the points *b*, *c*, will be the faces of the places of arms.

If lines are drawn, parallel to the lines which terminate the covert way, and the places of arms, at 20 toises distant from them, the space *x*, *x*, *x*, between these lines and those which terminate the covert-way, will be the glacis.

At the extremities of the places of arms, are traverses made, such as *v*, *v*, which serve to inclose them; these traverses are 3 toises thick, and as long as the covert-way is broad; and a passage is cut in the glacis round them, of about 6 or 8 feet, in order to have a free communication with the rest of the covert-way.

There are also traverses of the same dimensions before every salient angle of the bastion and outworks, and are in the same direction as the faces of those works produced; and the thickness lies at the same side as the parapets.

The passages round these last traverses are likewise from 6 to 8 feet wide.

In each place of arms are two sally ports *z z*, which are 10 or 12 feet wide, for the troops to sally out; in time of a siege they are shut up, with barriers or gates.

10. Construction of Arrows and Detached Redoubts.

An arrow is a work made before the salient angles of the glacis, such as A, fig. 3. It is composed of a parapet

OF
Covert-
ways, &c.
Plate
CXC VIII.

Fig. 1.

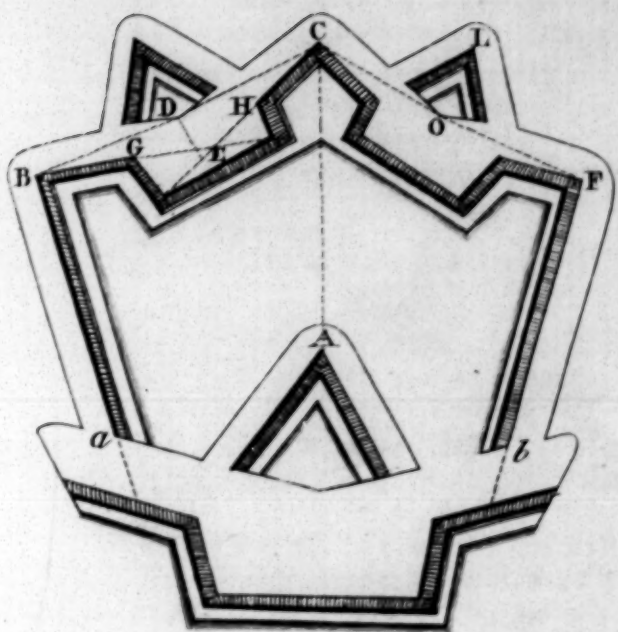


Fig. 3.

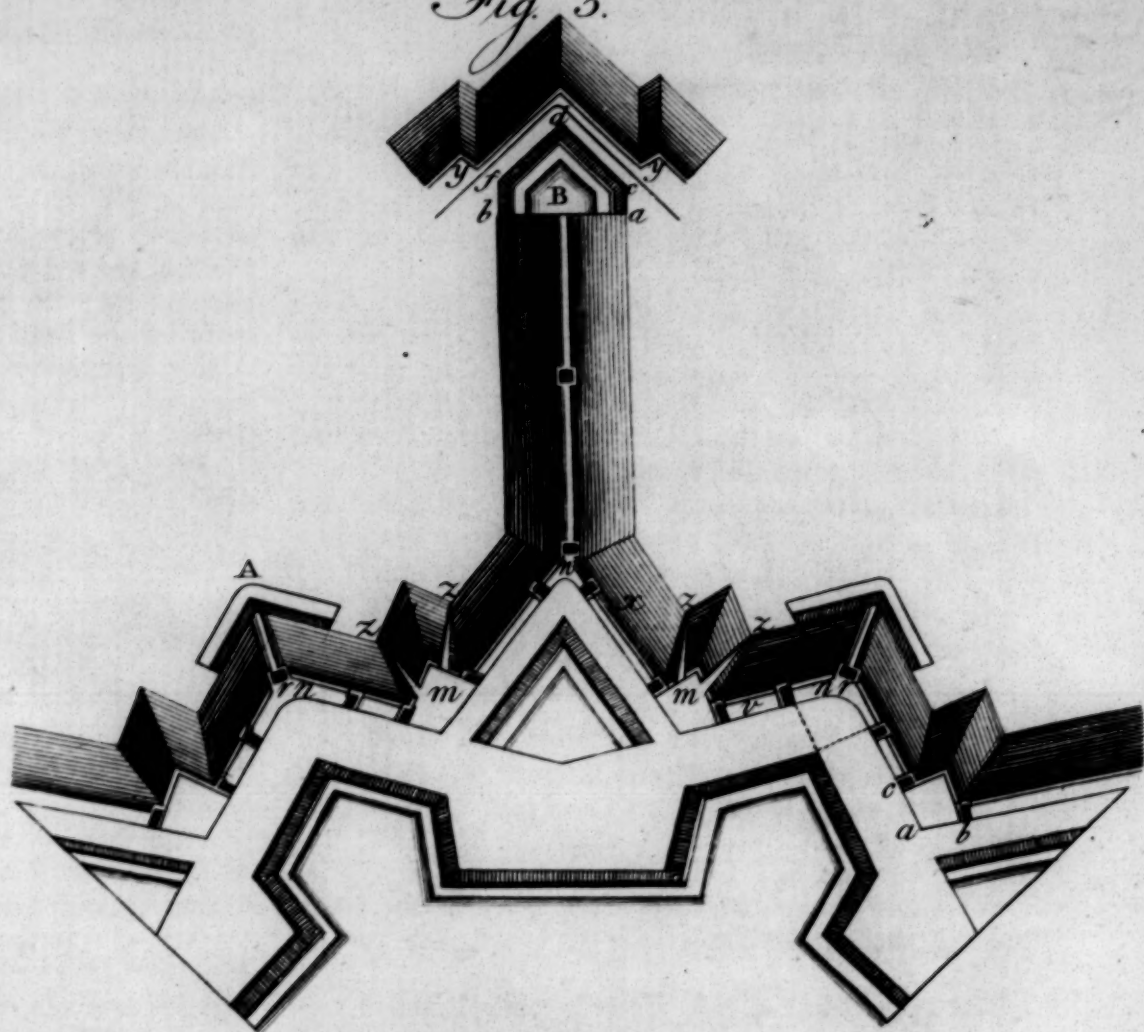


Fig. 2.

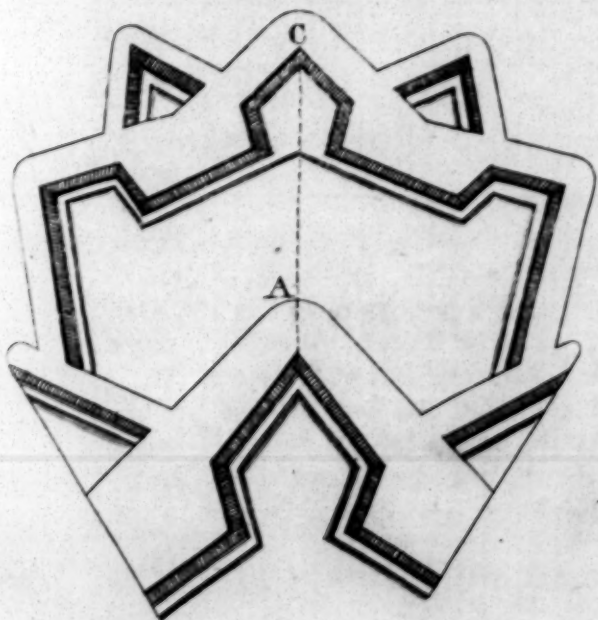
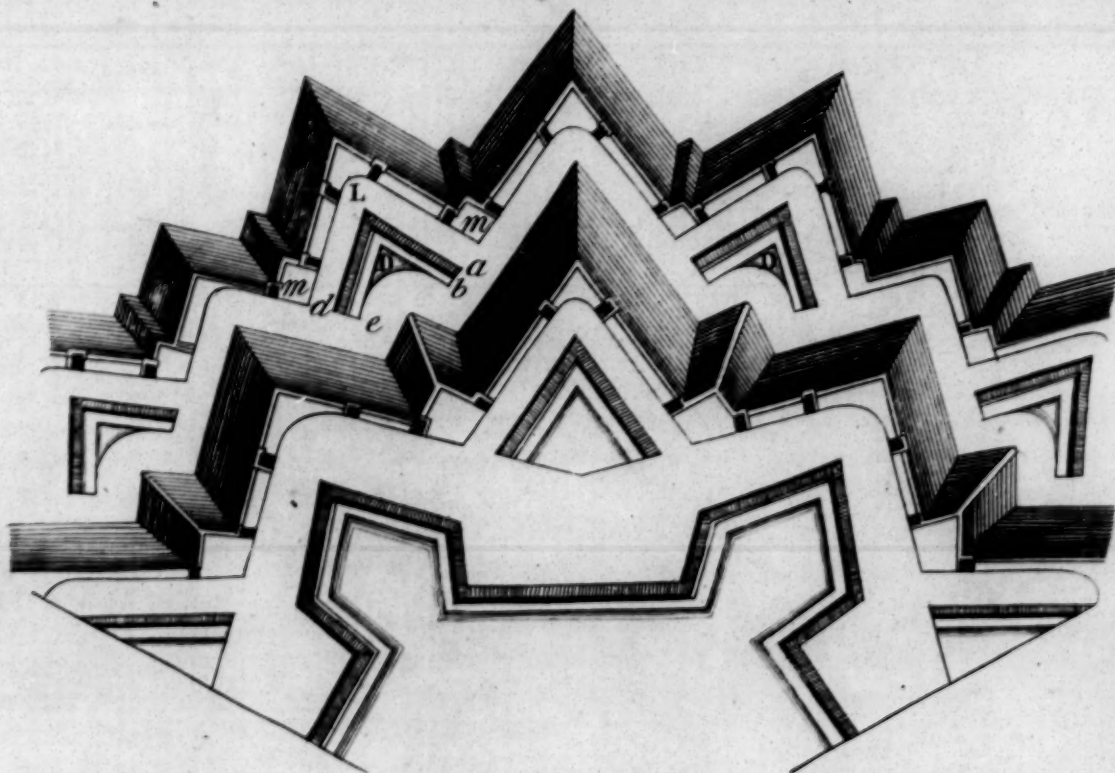


Fig. 4.



Thackara & Vallance Sc.



Of
Covert-
ways, &c.
Plate
CXCVIII.

parapet of 3 toises thick, and 40 long; and the ditch before it 5 toises, terminating in a slope at both ends. The communication from the covert-way into these arrows is 4 or 5 toises wide; and there is a traverse, *r*, at the entrance, of 3 toises thick, with a passage of 6 or 8 feet round it.

A detached redoubt is a kind of work much like a ravelin, with flanks placed beyond the glacis; such as B: they are made in order to occupy some spot of ground which might be advantageous to the besiegers; likewise to oblige the enemy to open their trenches farther off than they would do otherwise.

Their distance from the covert-way ought not to exceed 120 toises, that it may be defended by musket-shot from thence.

The gorge *ab* is 40 toises; the flanks *ac*, *bf*, which are perpendicular to the gorge, 10; and the faces *cd*, *fd*, 30: the ditch before it is 6 toises, ending in slopes at both ends; the covert-way 4; the branches of the covert-way are 42 toises long, or thereabouts; the faces of the places of arms *yy*, which are perpendicular to the branches, 10; and the other which is parallel to them, 14.

The communication from the covert-way into the redoubt is 5 or 6 toises wide; and there is a traverse made just at the entrance, and another in the middle when it is pretty long. The parapets of this communication terminate in a slope or glacis.

If these redoubts are above 50 toises distant from the covert-way the besiegers carry their trenches round, and enter through the gorge; by which the troops that are in them are made prisoners of war, if they do not retire betimes; to prevent which, some other outworks should be made to support them.

11. Construction of Second Ditches and Covert-ways.

Fig. 4. When the ground is low, and water to be found, there is often a ditch about 10 or 12 toises made round the glacis; and opposite to the places of arms are constructed lunettes, beyond the ditch: such as D, whose breadth on the counterscarp of the ditch is 10 toises, from *b* to *a*, and from *c* to *d*; and the faces *aL*, *dL*, are parallel to those of the places of arms; the ditch before them is from 8 to 10 toises wide.

The second covert-way is 4 toises, the semi-gorges of the places of arms, *m*, about 15, and the faces perpendicular to the counterscarp; the second glacis is from 15 to 18 toises broad.

This second covert-way has traverses every where, in the same manner as the first.

12. Construction of Profiles

A PROFILE is the representation of a vertical section of a work; it serves to show those dimensions which cannot be represented in plans, and is necessary in the building of a fortification. Profiles are generally constructed upon a scale of 30 feet to an inch. It would be endless to describe all their particular dimensions; we shall therefore lay down the principal rules only, given by M. Vauban on this subject.

1. Every work ought to be at least 6 feet higher than that before it, so that it may command those before it; that is, that the garrison may fire from all the works at the same time, with great and small arms, at

the besiegers in their approaches. Notwithstanding this specious pretence, there are several authors who object against it. For, say they, if you can discover the enemy from all the works, they can discover, by the same reason, all the works from their batteries, so that they may destroy them without being obliged to change their situation, and thereby dismount all the guns of the place before they come near it.

But if all the works were of the same height, those within cannot be destroyed, till such time as those before them are taken: guns might be placed in the covert-way and outworks to obstruct the enemy's approach; and when they come near the place, they might be transported into the inner-works: and as the body of the place would be much lower, the expence would be considerably diminished.

But when works are low, they are easily enfiladed by the ricochet batteries, which is a kind of firing with a small quantity of powder, by giving the gun an elevation of 10 or 12 degrees: this might however be partly prevented, by making the parapets near the salient angles, for the space of 8 toises on each side 5 or 6 feet higher than the rest of the works.

2. The covert way should be lower than the level-ground, otherwise the body of the place must be raised very high, especially where there are several outworks: this is to be understood only when the works exceed each other in height, otherwise it need not be below the level.

3. The bases of all inward slopes of earth should be at least equal to the height, if not more.

4. The bases of all outward slopes of earth, two-thirds of their heights.

5. The slopes of all walls or revetments should be one-fifth of their height; or one-sixth might perhaps be sufficient; the height of a wall is estimated from the bottom of the ditch, and not from the beginning of its foundation.

6. The slopes of all parapets and traverses are one-sixth of their breadth; that is, 3 feet towards the field; or the inside, where the banquettes should be 3 feet higher than the outside.

7. When the revetment of a rampart goes quite up to the top, 4 feet of the upper part is a vertical wall of 3 feet thick, with a square stone at the top of it projecting six inches; and a circular one below, or where the slope begins, of 8 or 10 inches diameter; they go quite round the rampart, and the circular projection is called the *cordon*.

Where the straight part of the wall ends and the slope begins, the wall is always made 5 feet thick: and the counterforts or buttresses reach higher than that place.

8. When the rampart is partly walled and partly turfed, then one-fifth of the height which is turfed must be added to 5 feet, to get the thickness of the wall above.

And having the thickness of any wall above, by adding one-fifth of its height from the bottom of the ditch, the sum will be the thickness of the wall at the bottom; but if a sixth part is only taken for the slope, then a sixth part must be added.

For instance, suppose a rampart of 30 feet high from the bottom of the ditch, and that 10 of which are to be turfed; then the fifth part of 10, which is 2, added

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to 5, gives 7 for the wall above; and as this wall is 20 feet high, the fifth of which is 4, and 4 added to the thickness 7 above, gives 11 for the thickness near the foundation.

Fig. 1. Represents, in military perspective, the profiles of the body of a place, the ravelin and covert-way; which gives a clear idea of what is meant by a profile, and from which those of all other works may be easily conceived.

SECT. II. Of Irregular Fortification.

THE most essential principle in fortification consists in making all the fronts of a place equally strong, so that the enemy may find no advantage in attacking either of the sides. This can happen no otherwise in a regular fortification situated in a plain or even ground; but as there are but few places which are not irregular either in their works or situations, and the nature of the ground may be such as makes it impracticable to build them regular without too great expence; it is so much the more necessary to show in what consists the strength or weakness of a town irregularly fortified, so that the weakest part may be made stronger by additional outworks; as likewise, if such a place is to be attacked, to know which is the strongest or weakest part.

1. Construction of an irregular place situated in an open country.

If the place to be fortified is an old town, inclosed by a wall or rampart, as it most frequently happens, the engineer is to consider well all the different circumstances of the figure, situation, and nature of the ground; and to regulate his plan accordingly, so as to avoid the disadvantages, and gain all the advantages possible: he should examine, whether by cutting off some parts of the old wall or rampart, and taking in some ground, the place can be reduced into a regular figure, or nearly so; for if that can be done without increasing the expence considerably, it should by no means be omitted. Old towns have often towers placed from distance to distance, as Douay, Tournay, and many other places, which are generally made use of, and mended when it may be done. If there is a rampart, without bastions or towers, it must be well considered whether bastions may not be added, or if it is not better to make only some outworks: if the ditch about this rampart is not too wide and deep, it would be advantageous to make detached bastions; otherwise ravelins and counterguards must be constructed. Special care must be taken to make all the sides of the polygon as nearly equal as possible, and that the length of the lines of defence do not exceed the reach of musket-shot; but if that cannot be done, those sides which are on the narrowest part should be made the longest.

If it should happen that some of the sides are inaccessible or of very difficult approach, either on account of some precipice, marshy ground, or inundation, they may be made much longer than the others which are of easy access, and the flanks need not be so large as the rest; by doing so, there will be some expences saved, which may be used in making the other sides stronger by adding more outworks.

There are few situations but what are more advan-

tageous in some parts than in others; it is therefore the business of an engineer to distinguish them and to render those side strong by art which are not so by nature.

If the situation is low and watery, lunettes or tenail-lons, and such other small outworks, should be constructed; because they are not of any great expence, and may make a very good defence. But if one side of the place only is low, and running water is to be had, a second ditch and covert-way with lunettes may be made, by observing that if the first glacis is made to slope, so as to become even with the level of the water in the second ditch; or if the water can be swelled by means of dykes or sluices, so as to overflow the best part of the first glacis, it should be done; for by so doing these works will be able to make a very good defence, since the besiegers will find it a difficult matter to lodge themselves upon this glacis; which cannot be done but within a few toises of the first covert-way, where the besieged are ready to receive them, and to destroy their works with great advantage; whereas the enemy cannot support their workmen but from the second covert-way, which is too far off to be of any great service to them.

But if the situation is of a dry nature, without any water about it, caponiers should be made in the great ditch, from the curtains to the ravelin, and batteries raised in the entrance of the ditch before the ravelin, whose parapet must slope off into a glacis so as to afford no cover for the enemy behind them. Arrows and detached redoubts are likewise very proper to be used in such a case; and sometimes horn or crown works, if it should be thought convenient: but these works should never be constructed without an absolute necessity, either to occupy a spot of ground which might be advantageous to the enemy, or to cover some gate or entrance into the town; for they are of great expence, and their defence seems not to be answerable to it.

Most of the places in Flanders are fortified with horn-works, such as Ipres, Tournay, Lille, and others.

If the place to be fortified is new, and the situation will not admit of a regular construction, particular care must be taken in choosing such a spot of ground as is most advantageous, and least liable to any disadvantages either in the building or in the maintaining of it. All hills or rising grounds should be avoided, which might command any part of the works; marshy grounds, because such situations are unwholesome; or lakes and standing waters for the same reason, excepting a lake is or may be made navigable. Good water should be had either within the place or near it, for it is absolutely necessary for men and cattle; the air should be wholesome; otherwise the continual sickness that may reign in such a place might prevent people from coming to live in it, and the garrison would not be in a condition to defend themselves as they ought to do. In short, all the different circumstances attending such an undertaking should be maturely considered before a resolution is taken to fortify any place.

When a situation is fixed upon, the next thing to be considered is, the bigness of the town and the number of its outworks; which must absolutely depend upon the consequence such a place is of to a nation. If it is only to guard a pass or entrance into a country, it need not be so large: but if it is to be a place either to promote

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FORTIFICATION.

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Fig. 1.



Profile of the Body of the Place and the Ravelin with Revetement.



Profile of the Body of the Place & the Ravelin with demi-Revetement.



Fig. 2.

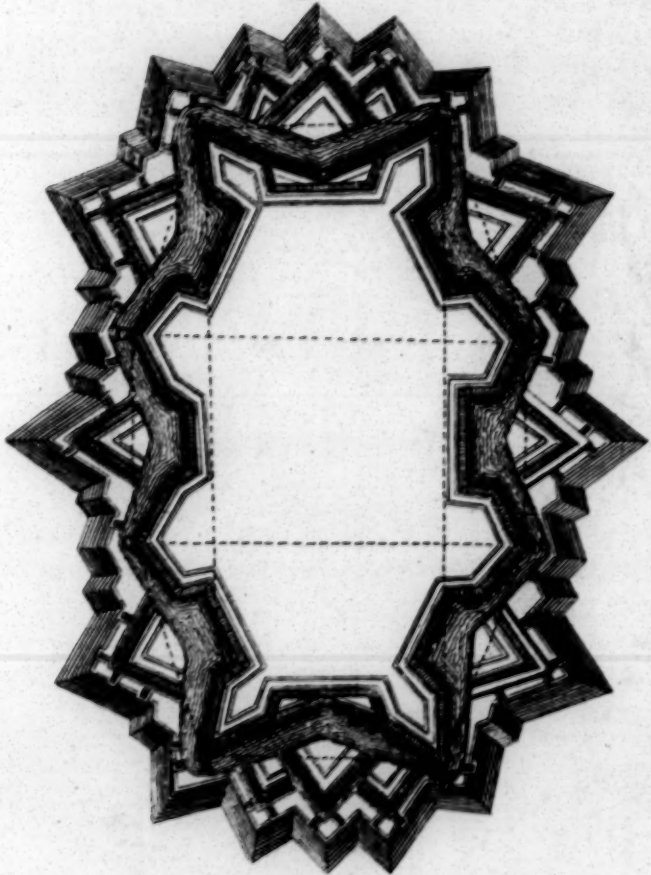
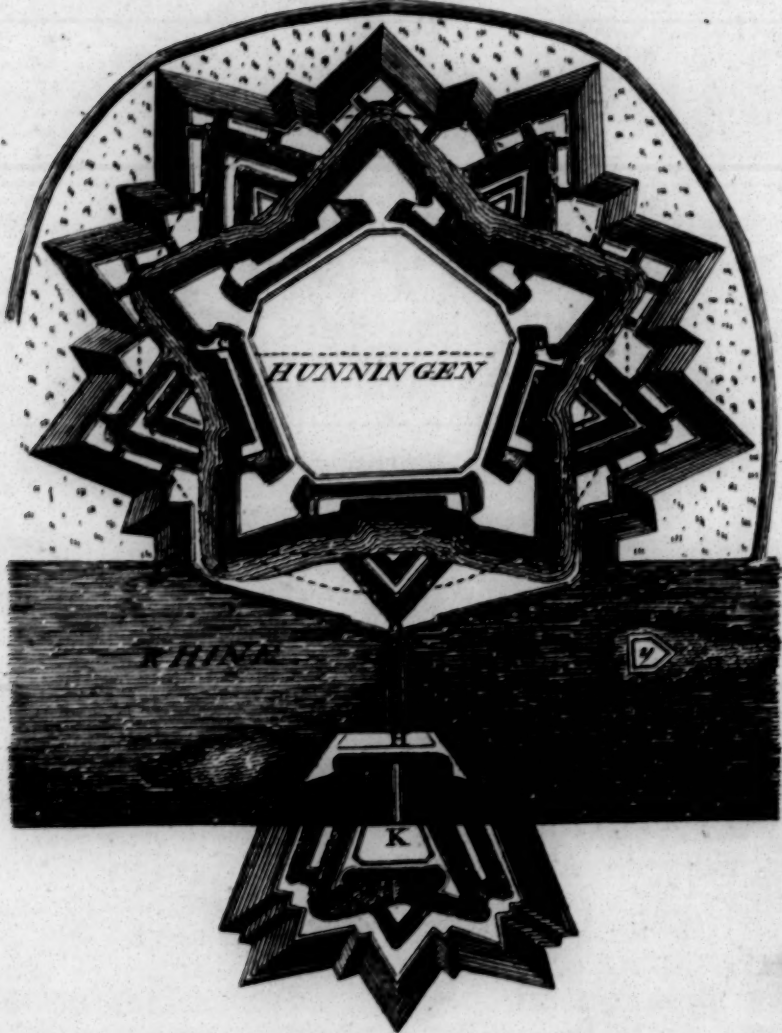


Fig. 3.





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promote or to protect trade, it should be large and commodious : the streets should be wide, and the buildings regular and convenient. As to what regards the fortification, its construction should depend on the nature of the situation, and the number of works, on the funds or expence a prince or a nation will be at ; which, however, ought to be according to the benefit arising from such a place : for as such undertakings are of very great expence, an engineer cannot be too sparing in his works ; on the contrary, the greatest economy should be used both in regard to the number of works and to the construction. The body of the place may have (A) revetments quite up to the top, or only in part, and the rest turfed ; but as to the outworks, they should have half revetments, or they may be made with turf only : as being not so necessary to prevent the place from being surpris'd, which may nevertheless make a good defence.

Fig 2. is the plan of an octagon, one half of which is similar and equal to the other half ; it being suppos'd, that the situation would not admit of fortification quite regular. The exterior sides are each 180 toises, and the works are constructed according to our method : but because the sides AB, EF, are weaker than the rest, as has been proved before, we have added tenailles, redoubts in the ravelins, and lunettes, to render them nearly equal in strength with the others ; and if counter-guards were made before the bastions A and B, it would effectually secure that front. Instead of lunettes, any other works may be made, as may be thought convenient and according to the nature of the ground. If it should be judged necessary to add other outworks to the ravelins all round the place, care must be taken to add likewise more to the fronts AB, EF, in order to render the advantages and disadvantages of attacking on either side equal.

2. *Construction of an irregular place situated on a hill or rock.*

In the construction of such places, care must be taken that no neighbouring hill commands any part of the works. The town should always be built on the highest part ; but if it should be thought more convenient to place it lower, then the upper part must be fortified with a fort. The situation should be made level as near as possible, by removing the earth from some places to fill up others ; and if it cannot well be levelled without extraordinary expence, works must be made on the highest part, so as to command and protect the lower. The works ought to occupy all the upper part of the hill ; but if it should be too extensive to be all inclosed, or so irregular as not to be fortified without great inconvenience, the parts which fall without should be fortified with some detached works, and a communication with the place must be made either above or under ground. There should be no cavity or hollow roads within cannon-shot round about the place, where the enemy might be able to approach under cover. If there should happen to be a spring near the top of the hill, it should be inclosed in the fortification ; or if that cannot be done, by some work or other : for there is

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nothing more necessary, and at the same time scarcer, in such situations, than water ; for which reason there cannot be too much care in providing it : several cisterns are to be made to receive the rain-water, and to preserve it ; wells should be dug likewise, though ever so deep, the water of which will serve for common use.

Places built on hills or rocks should never be large ; for their use is generally to guard passes or inlets into a country, and are seldom useful in traffic ; and it is a difficult matter to provide for a large garrison in such situations, neither should any such place be built without some very material reasons : but when it is absolutely necessary, great care and precaution should be taken to render the works as perfect as the situation will admit of, and at the same time to be as frugal in the expence as possible.

3. *Construction of irregular fortifications situated near rivers, lakes, or the sea.*

As the intent of building these kind of places is chiefly to facilitate and protect trade, they are of more importance than any other kind, especially in maritime countries, where the principal strength and power depends on them : for which reason we shall treat of this construction more largely than of any other.

The first thing to be considered is their situation, which ought to be such as to afford a good harbour for shipping, or a safe and easy entrance in stormy weather ; but as it is hardly possible to find any where ships may go in and lie secure with all winds, care should be taken to make them safe to enter with those winds which are most dangerous : but it is not sufficient that the harbour is safe against stormy weather, they should likewise be so against an enemy both by land and water ; for it often happens, that ships are destroyed where it was imagined they were secure, which is of too great consequence not to be provided against ; for which reason, forts or batteries must be built in the most convenient places, to prevent the enemy's ships from coming too near, so as to be able to cannonade those in the harbour, or sling shells among them ; and if there is any danger of an enemy's approach by land, high ramparts and edifices must be built, so as to cover them.

When a river is pretty large, and it is not convenient for making a harbour without great expence, the ships may ride along the shore ; which, for that reason, must be made accessible for ships of burthen : this may be done by advancing the quay into the river if the water is too shallow, or by digging the river sufficiently deep for that purpose.

And to prevent an enemy from coming up the river, forts must be built on both sides, especially where there are any turnings or windings. Antwerp is such a place : for the Scheldt is sufficiently deep to carry ships of great burden, which may come quite near the town-wall ; and several forts are built below it on both sides, so that it would not be an easy matter for an enemy to come up the river.

When the river is but small, so that no ships of bur-

3 A

den

(A) Revetments are chiefly made to prevent a place from being surpris'd : outworks do not want to be made so ; the taking them by surprise is of no great consequence, except in a siege, when other cautions are used to prevent it.

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den can come through it, it is sufficient to make it run through some of the works, where proper landing-places are contrived, from whence the goods may be carried in to the place; as at Sarrelouis, where a hornwork is built beyond the Sarre, in the gorge of which the goods are landed.

If the breadth of the river does not exceed 200 yards, it commonly passes through the middle of the town, and proper quays are made on each side; in such a case, the fortification is so contrived, as that the river passes through the curtain, in order to have a bastion on each side to defend the coming in and going out.

When M. Vauban fortified near rivers, he made always the exterior side near the water much longer than any of the others: such as Hunninghen on the Rhine, and Sarrelouis on the Sarre; but for what reason he fortified these places in that manner, has not been told by any author.

But it is plain that the sides which terminate at the river are the weakest; because the besiegers trenches being secured by the river, they may draw most of their troops off, and act therefore with more vigour and strength on the other side: besides, as the strength of a side increases in proportion as the angle of the polygon is greater, by making the side next the river longer, the angles at its extremities become wider, and consequently the adjacent sides stronger.

There are other advantages, besides those mentioned already, which arise from the lengthening that side: for if the river is pretty deep so as not to be fordable, that side is not liable to be attacked; and by increasing its length, the capacity of the place increases much more in proportion to the expence, than if more sides were made; the centre of the place will be likewise nearer the river, which makes it more convenient for transporting the goods from the water-side to any part of the town.

Fig. 3.

To illustrate this method of M. Vauban's we shall give the plan of Hunninghen: this place was built for the sake of having a bridge over the Rhine, for which reason he made it only a pentagon; the side AB next to the river is 200 toises, and each of the others but 180.

About the space *abc*, which lies before the front AB, is a stone wall; and the passages *xx* are shut up with sluices, to retain the water in the ditches in dry seasons: and to prevent an enemy from destroying the sluice near the point *c*, whereby the water would run out and leave the ditches dry, the redoubt *y* was built in the little island hard by, in order to cover that sluice; without which precaution the place might be insulted from the river side, where the water is shallow in dry seasons.

The hornwork K beyond the Rhine was built to cover the bridge; but as this work cannot be well defended cross the river, the hornwork H was made to support the other.

Before finishing the description of this plan, we shall show how to find the long side AB.

After having inscribed the two sides GE, GF, in a circle, draw the diameter CD, so as to be equally distant from the line joining the points E F that is parallel to it. On this diameter set off 100 toises on each side of the centre; from these points draw two indefinite perpendiculars to the diameter; then if from the points EF, as centres, two arcs are described with a radius of 180 toises, their intersections, A and B, with the said perpendiculars, will determine the long side AB, as likewise the other two FB and EA. In like manner may be found the long or short side of any polygon whatsoever.

When a place near a river is to be fortified for the safety of commerce, particular care should be taken in leaving a good space between the houses and the water-side, to have a key or landing place for goods brought by water; it should also be contrived to have proper places for ships and boats to lie secure in stormy weather, and in time of a siege; and as water-carriage is very advantageous for transporting goods from one place to another, as likewise for bringing the necessary materials, not only for building the fortifications, but also the place itself, the expences will be lessened considerably when this convenience can be had; for which reason, places should never be built any where else but near rivers, lakes, or the sea; excepting in extraordinary cases, where it cannot be avoided.

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F O R

Fortin
Fortitude.

FORTIN, FORTELET, or Field-fort, a sconce or little fort, whose flanked angles are generally 120 fathoms distant from one another.

The extent and figure of fortins are different, according to the situation and nature of the ground; some of them having whole bastions, and others demi-bastions. They are made use of only for a time, either to defend the lines of circumvallation, or to guard some passage or dangerous post.

FORTISSIMO, in music, sometimes denoted by FFF, or *fff*, signifies, to sing or play very loud or strong.

FORTITUDE, a virtue or quality of the mind, generally considered as the same with COURAGE; tho' in a more accurate sense they seem to be distinguishable. Courage may be a virtue or a vice, according to circumstance; *fortitude* is always a virtue; we speak

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of desperate courage, but not of desperate fortitude. A contempt or neglect of danger, without regard to consequences, may be called *courage*; and this some brutes have as well as we: in them it is the effect of natural instinct chiefly; in man it depends partly on habit, partly on strength of nerves, and partly on want of consideration. But fortitude is the virtue of a rational and considerate mind, and is founded in a sense of honour and a regard to duty. There may be courage in fighting a duel, though that folly is more frequently the effect of cowardice: there may be courage in an act of piracy or robbery; but there can be no fortitude in perpetrating a crime. Fortitude implies a love of equity and of public good: for, as Plato and Cicero observe, courage exerted for a selfish purpose, or without a regard to justice, ought to be called audacity rather than fortitude.

This

Fortitude,
Fortuna.

This virtue takes different names, according as it acts in opposition to different sorts of evil; but some of those names are applied with considerable latitude. With respect to danger in general, fortitude may be termed *intrepidity*; with respect to the dangers of war, *valour*; with respect to pain of body or distress of mind, *patience*; with respect to labour, *activity*; with respect to injury, *forbearance*; with respect to our condition in general, *magnanimity*.

Fortitude is very becoming in both sexes; but courage is not so suitable to the female character: for in women, on ordinary occasions of danger, a certain degree of timidity is not unseemly, because it betokens gentleness of disposition. Yet from those of very high rank, from a queen or an empress, courage in emergencies of great public danger would be expected, and the want of it blamed; we should overlook the sex, and consider the duties of the station. In general, however, masculine boldness in a woman is disagreeable; the term *virago* conveys an offensive idea. The female warriors of antiquity, whether real or fabulous, Camilla, Thalestris, and the whole community of AMAZONS, were unamiable personages. But female courage exerted in defence of a child, a husband, or a near relation, would be true fortitude, and deserve the highest encomiums.

The motives to fortitude are many and powerful. This virtue tends greatly to the happiness of the individual, by giving composure and presence of mind, and keeping the other passions in due subordination. To public good it is essential; for without it, the independence and liberty of nations would be impossible. It gives to a character that elevation which poets, orators, and historians, have in all ages vied with one another to celebrate. Nothing so effectually inspires it as rational piety; the fear of God is the best security against any other fear. A true estimate of human life; its shortness and uncertainty; the numberless evils and temptations to which by a long continuance in this world we must unavoidably be exposed; ought by no means to discourage or to throw any gloom on our future prospects: they should teach us, that many things are more formidable than death; and that nothing is lost, but much gained, when, by the appointment of Providence, a well-spent life is brought to a conclusion.

Let it be considered too, that pusillanimity and fearfulness can never avail us any thing. On the contrary they debase our nature, poison all our comforts, and make us despicable in the eyes of others; they darken our reason, disconcert our schemes, enfeeble our efforts, extinguish our hopes, and add tenfold poignancy to all the evils of life. In battle, the brave soldier is in less danger than the coward; in less danger even of death and wounds, because better prepared to defend himself; in far less danger of infelicity; and has before him the animating hope of victory and honour. So in life, the man of true fortitude is in less danger of disappointment than others are, because his understanding is clear, and his mind disencumbered; he is prepared to meet calamity without the fear of sinking under it; and he has before him the near prospect of another life, in which they who piously bear the evils of this will obtain a glorious reward.

FORTUNA, a goddess worshipped with great de-

votion by the ancient Greeks and Romans; who believed her to preside over human affairs, and to distribute wealth and honour at her pleasure. See FORTUNE.

Fortunate,
Fortune.

FORTUNATE-ISLANDS, in ancient geography, certain islands (concerning the situation of which authors are not agreed) famous for the golden apples of the HESPERIDES.—The common opinion is, that they are the CANARY Islands.

FORTUNE (*Τύχη*), a name which among the ancients seems to have denoted a principle of fortuity, whereby things came to pass, without being necessitated thereto: but what and whence that principle is, they do not seem to have ever precisely thought.—Hence their philosophers are often intimating, that men only framed the phantom *Fortune* to hide their ignorance; and that they call *Fortune* whatever befalls a man without his knowing for what purpose. Hence Juvenal (sat. x. ver. 366.) affirms, there were men who made a deity of Fortune.

*Nullum numen abest, si sit prudentia; sed te
Nos facimus, Fortuna, deam, caloque locamus.*

The ingenious Mr Spence gives another reading of this passage:

*Nullum numen habes, si sit prudentia; sed te
Nos facimus, Fortuna, deam caloque locamus.*

This reading, he thinks, agrees best with the context: Juvenal says, ver. 356. that the two things we should pray for are good health and good sense, that we might be the authors of our own happiness if we pleased, ver. 363; that virtue is the only way to true happiness, ver. 364; that if we ourselves are prudent, Fortune has no power over us; and that, in truth, she is no goddess at all, and has only usurped a seat in heaven from the folly of mankind, ver. 366. Fortune was not considered as a deity by the old Romans, but was made so by the devotion and folly of the vulgar; and Mr Spence says, that he has seen an ancient gem, in which Cybele, the mother of the gods, is represented as turning away her head from Fortune, in an attitude of disowning and rejecting her; (Polymetis, p. 150, 154. &c.)

According to the opinion of the heathens, therefore, fortune in reality was only the arrival of things in a sudden and unexpected manner, without any apparent cause or reason: so that the philosophical sense of the word coincides with what is vulgarly called *chance*.

But in religion it had a farther force; altars and temples in great numbers were consecrated to this Fortune, as a deity. This intimates, that the heathens had personified, and even deified, their chance; and conceived her as a sort of goddess, who disposed of the fate of men at her pleasure. Hence that invocation of Horace, *O diva, gratum quæ regis Antium*, in the 35th ode of the first book, where he recommends Augustus, then preparing for a visit to Britain, to her protection. From these different sentiments it may be inferred, that the ancients at one time took Fortune for a peremptory cause, bent upon doing good to some, and persecuting others; and sometimes for a blind inconstant cause, without any view or determination at all.

If then the word *fortune* had no certain idea in the mouth of those who erected altars to her, much less can it be ascertained what it denotes in the mind of those

Fortune
Forum.

those who now use the word in their writings. They who would substitute the name *Providence* in lieu of that of *Fortune*, cannot give any tolerable sense to half the phrases wherein the word occurs.

Horace paints the goddess, preceded by Necessity, holding nails and wedges in her hands, with a cramp-iron, and melted lead to fasten it; rarely accompanied with Fidelity, unless when she abandons a family; for in that case Fidelity never fails to depart with her, as well as friends.

She is disrespectfully spoken of by most of the Roman writers, and represented as blind, inconstant, unjust, and delighting in mischief, (*Ovid ad Liv. ver. 52. ver. 374. Hor. lib. i. od. 34. ver. 26. lib. iii. od. 29. ver. 51. Statius, Theb. xii. ver. 505.*) However, they had a good as well as a bad Fortune, a constant and inconstant Fortune; the latter of which was represented with wings, and a wheel by her, (*Hor. lib. iii. od. 29. ver. 36.*) Juvenal alludes to a statue of Fortune, which exhibited her under a very good character, as the patroness of the poor infants that were exposed by their parents in the streets, (*Sat. vi. ver. 605.*)

The painters represent her in a woman's habit, with a bandage before her eyes, to show that she acts without discernment, and standing on a wheel, to express her instability. The Romans, says Lactantius, represented her with a cornucopia, and the helm of a ship, to show that she distributes riches, and directs the affairs of the world. In effect, it is with such characters that we see her represented on so many medals, with the inscriptions, *FORTUNA AVG. FORTUNA REDVX. FORTUNA AVG. OF REDVCIS*, &c. Sometimes she is seen pointing at a globe before her feet, with a sceptre in one hand, and holding the cornucopia in the other.

The Romans had a virile as well as a muliebrian Fortune, for the objects of their adoration: the *Fortuna virilis* was honoured by the men, and the *Fortuna muliebris* by the women. They honoured Fortune also under a variety of other appellations.

The Romans derived the worship of Fortune from the Greeks, under the reign of Servius Tullius, who dedicated the first temple to her in the public market. Nero also built a temple to Fortune. The Fortune worshipped at Antium was probably of the most exalted character of any among the Romans; if we may judge by the account which Horace gives us of the great solemn processions that were made to her, (*Hor. lib. i. od. 35. ver. 22.*) But the most celebrated temple of Fortune was at Præneste. Statius speaks of several Fortunes there, and calls them the *Prænestinae sorores*, (*Lib. i. Sylv. iii. ver. 80.*)

FORTUNE-Tellers. Persons pretending to tell fortunes are to be punished with a year's imprisonment, and standing four times on the pillory. *Stat. 9 Geo. II. c. 5.*

FORTY-DAYS Court, the court of attachment or *woodnote*, held before the verderors of the forest office every forty days, to inquire concerning all offenders against vert and venison. See **ATTACHMENT**.

FORUM, in Roman antiquity, a public standing place within the city of Rome, where causes were judicially tried, and orations delivered to the people.

FORUM was also used for a place of traffic, answering to our market-place. These were generally called

fora venalia; in contradistinction to the former, which were called *fora civilia*.

The *fora civilia* were public courts of justice, very magnificent in themselves, and surrounded with porticos and stately edifices; of these there were six very remarkable: 1. *Forum Romanum*. 2. *Julianum*. 3. *Augustum*. 4. *Palladium*. 5. *Forum Trajani*. 6. *Forum Salustii*. The *Forum Romanum* was the most noted, and is often called simply *Forum*, by way of eminence. Here was the pleading-place called *Rostra*, the *Comitium*, the sanctuary of *Saturn*, temple of *Castor*, &c. See **ROSIRA**, **COMITIUM**, &c.

The *fora venalia*, or market-places, were very numerous. The chief of them were the *forum boarium* for oxen or beef; *suarium* for swine; *pistorium* for bread; *cupedinarium* for dainties; *olitorium* for garden stuff.

The Grecian *Agoras* exactly corresponds with the Roman *fora*, being places where courts and markets were held. At Athens they had many *fora*, but the chief of them were the *old* and the *new*.

FORUM Indicare, was the act of the prætor appointing the place in Rome where causes were to be tried. *Agere forum* denoted the bringing on causes out of Rome, in a Roman province (*Cicero, Suetonius*); the same with *agere conventum* (*Florus*).

The term *forum* added to a proper name, denoted some market town or borough; as,

FORUM Alieni, a place mentioned only by Tacitus; and, from what he says of it, thought to be *Ferrara*, capital of the duchy of that name in Italy. E. Long. 12. 5. N. Lat. 44. 46.

FORUM Apii (*Cicero, Luke*); a town of the Volsci, in Latium, on the Via Appia, a little beyond the Tres Tabernæ; set down in the Jerusalem Itinerary as situated near the river Nymphæus: now entirely extinct.

FORUM Cornelii, a town of the Cispadana, built by Sylla: Now *Imola*, a city in the Romania, and territory of the pope. E. Long. 12. 12. N. Lat. 44. 30.

FORUM Domitii, a town of Gallia Narbonensis; probably built by Ahenobarbus Domitius, who commanded in those parts: Now *Frontignan*, or *Frontigniac*, in Languedoc, near the Mediterranean. E. Long. 3. 30. N. Lat. 43. 30.

FORUM Fulvii, a town of Liguria, surnamed *Valentinum*; from which it is conjectured that it is now *Valenza*, in the duchy of Milan; which is confirmed by Peutinger's distances. E. Long. 9°. N. Lat. 45°.

FORUM Gallorum, a small town of the Cispadana, on the Via Emilia, eight miles from Mutina, beyond the river Scultenna. Here Antony defeated Pansa, and was in his turn defeated by Hirtius: Now *Castelfranco*, in the territory of Bologna.—Another *Forum Gallorum*, a town of the Vascones in the Hither Spain: Now *Gurrea*, a small town of Arragon.

FORUM Julium. There are several towns of this name; as a *Forum Julium*, of Gallia Narbonensis; or *Forojulium*: Now *Frojus*, or *Frejules*, in Provence, at the mouth of the Argens. *Forum Julium Carnorum*, to the north of Aquileia, in the Transpadana; Now *Cividale di Friuli*, formerly *Cividale d' Austria*, in the territory of Venice.

FORUM Jutuntorum, a town of the Insubres, in the Transpadana: Now *Crema*, capital of the Cremasco, in

Forum.

Ear of Corn.



Plants in Stone.



Leaves of Trees.



Corals.

Tubularia.



Stellate Plants.



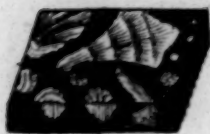
Mosses



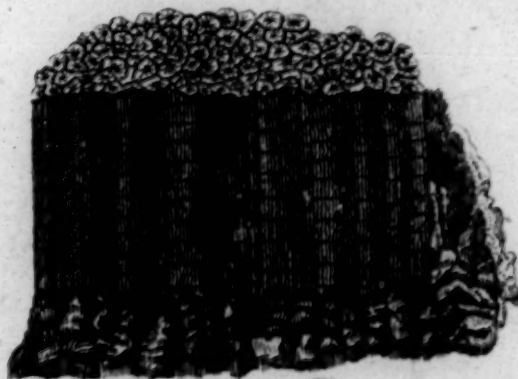
Porpites.



Porus.



Lithostrotion.



Junci Lapidei.



Calamus Indicus.



Astroites.



Mycetites.



Fishes Teeth.

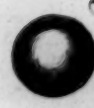
Glossopetree.



Plectronita.



Buffonita.



Ichthyopteria.



1891



Dentalia.



Pectinas.



Concha Margaritifera.

Conchae.



Cylindri.



Tubulus Marinus.



Syringoides Lapis.



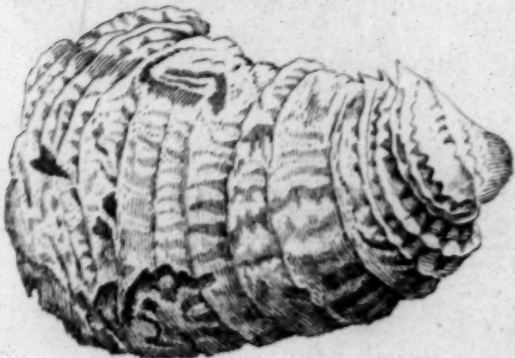
Orthoceratites.



Judaicus Lapis. Cochleae.



Ostracites.



Nautili.



Echinites.



Verites.



Trochi.



Buccina.



Gryphites.



Ammonites or Snake Stones.



Asteria or Star Stones.



Asteropodium.



Trochites.





Forum
|
Fosse.

in the territory of Venice. E. Long. 10. 15. N. Lat. 45. 20.

FORUM Livii, a town of the Semnones, in the Cispadana: Now *Forli*, in Romania. E. Long. 12. 45. N. Lat. 44. 25.

FORUM Segusianorum, situated on the east side of the Liger, in Gallia Celtica: Now *Feurs*, on the Loire, in the Lionnois, capital of the territory of Forez. E. Long. 4. 15. N. Lat. 45. 44.

FORUM Tiberii, a town of the Pagus Tigurinus, in Belgica, on the left or south side of the Rhine: Now *Kayserstull*; literally the tribunal of Tiberius, which he held there when commander in the Rhetian war.

FORUM Vulcani (Strabo): the *Campi Phlegraei* of Pliny: a plain in Campania, encompassed with rocky eminences, near Puteoli, and distant from it two miles towards Naples, emitting smoke, and in some places flame, like a large extensive furnace, and yielding sulphur: Now called *Solfatara*, in the Terra di Lavoro.

FORUM, is also used, among casuists, &c. for jurisdiction: thus they say, *In foro legis*, &c.

FOSS, or *Fosse*, in fortification, &c. a ditch or moat. The word is French, formed of the Latin participle *fossus*, of the verb *fodio* "I dig."

Foss, *Fossa*, in anatomy, a kind of cavity in a bone, with a large aperture, but no exit or perforation. When the aperture is very narrow, it is called a *sinus*.

Foss is particularly used for the cavity or denture in the back part of the neck.

FOSSA MAGNA, or *NAVICULARIS*, is an oblong cavity, forming the inside of the *pubendium muliebre*, and which presents itself upon opening the labia; and in the middle whereof are the *carunculae myrtiformes*. See *ANATOMY*, p. 470.

Fossa, in our ancient customs, was a ditch full of water, where women committing felony were drowned; as men were hanged: *Nam et ipsi in omnibus tenementis suis omnem ab antiquo legalem habere justitiam, videlicet ferrum, fossam, furcas, et similia*. In another sense it is taken for a grave, as appears by these old verses:

*Hic jacent in fossa Bedæ venerabilis ossa;
Hic est fossatus, qui bis erat hic cathedratus.*

Foss-way was anciently one of the four great Roman high-ways of England: so called, according to Camden, because it was ditched on both sides, which was the Roman method of making highways.

FOSSARII, in antiquity, a kind of officers in the eastern church, whose business was to inter the dead.

Ciaconius relates, that Constantine created 950 fossaries, whom he took out of the divers colleges or companies of tradesmen: he adds, that they were exempted from taxes, services, burdensome offices, &c.

F. Goar, in his notes on the Greek Eucharistion, insinuates that the fossarii were established in the times of the apostles; and that the young men, who carried off the body of Ananias, and those persons full of the fear of God who interred St Stephen, were of the number.

St Jerom assures us, that the rank of fossarii held the first place among the clerks; but he is to be understood of those clerks only who had the direction and intendance of the interment of the devout.

FOSSE, the Roman Military-way in South Britain,

begins at Totness, and passes through Exeter, Ivelchester, Shepton-Mallet, Bath, Cirencester, Leicester, the Vale of Belvoir, Newark, Lincoln, to Barton upon the Humber, being still visible in several parts, tho' of 1400 years standing. It had the name from the fosses or ditches made by the sides of it.

FOSSIL, in natural history, denotes, in general, every thing dug out of the earth, whether they be natives thereof, as metals, stones, salts, earths, and other minerals; or extraneous, repositied in the bowels of the earth by some extraordinary means, as earthquakes, the deluge, &c. See *METAL*, *STONE*, &c.

Native fossils, according to Dr Hill, are substances found either buried in the earth, or lying on its surface of a plain simple structure, and showing no signs of containing vessels or circulating juices. These are subdivided by the same author, 1. Into fossils naturally and essentially simple. Of these, some are neither inflammable nor soluble in water; as simple earths, talcs, fibrariae, gypsum, selenitæ, crystal, and spars: others, though uninflammable, are soluble in water; as all the simple salts: and others, on the contrary, are inflammable, but not soluble in water; as sulphur, auripigmentum, zarnich, amber, ambergris, gagates, asphaltum, amepelites, lithanthrax, naphtha, and pissasphalta. 2. The second general subdivision of fossils comprehends all such as are naturally compound, but unmetallic. Of these, some are neither inflammable, nor soluble in water; as compound earths, stones, septariae, siderochita, semipellucid gems, &c. others are soluble in water, but not inflammable; as all the metallic salts: and, lastly, some are inflammable, but not soluble in water; as the marcasites, pyritæ, and phlogonia. 3. The third, and last, general division of fossils comprehends all the metallic ones; which are bodies naturally hard, remarkably heavy, and fusible in fire. Of these, some are perfectly metallic, as being malleable when pure; such are gold, lead, silver, copper, iron, and tin: others are imperfectly metallic, as not being malleable even in their purest state; such are antimony, bismuth, cobalt, zinc, and quicksilver or mercury. Of all which substances, the reader will find a particular description under their respective heads.

Extraneous fossils are bodies of the vegetable or animal kingdoms accidentally buried in the earth. Of the vegetable kingdom, there are principally three kinds, trees or parts of them, herbaceous plants, and corals; and of the animal kingdom there are four kinds, sea-shells, the teeth or bony palates and bones of fishes, complete-fishes, and the bones of land-animals. See *BONES*, *TREE*, *WOOD*, *PLANT*, *SHELL*, &c.

These adventitious or *extraneous* fossils, thus found buried in great abundance in divers parts of the earth, have employed the curiosity of several of our latest naturalists, who have each their several system to account for the surprising appearances of petrefied sea-fishes, in places far remote from the sea, and on the tops of mountains; shells in the middle of quarries of stone; and of elephants teeth, and bones of divers animals, peculiar to the southern climates, and plants only growing in the east, found fossil in our northern and western parts.

Some will have these shells, &c. to be real stone, and

Fossil.

Plates
CC & CCL.

Fossil,
Foster.

and stone plants, formed after the usual manner of other figured stones; of which opinion is the learned Dr Lister.

Another opinion is, that these fossil shells, with all their foreign bodies found within the earth, as bones, trees, plants, &c. were buried therein at the time of the universal deluge; and that, having been penetrated either by the bituminous matter abounding chiefly in watery places, or by the salts of the earth, they have been preserved entire, and sometimes petrefied.

Others think, that those shells, found at the tops of the highest mountains, could never have been carried thither by the waters, even of the deluge; inasmuch as most of these aquatic animals, on account of the weight of their shells, always remain at the bottom of the water, and never move but close along the ground. They imagine, that a year's continuance of the waters of the deluge, intermixed with the salt waters of the sea, upon the surface of the earth, might well give occasion to the production of shells of diverse kinds in different climates; and that the universal saltiness of the water was the real cause of their resemblance to the sea-shells, as the lakes formed daily by the retention of rain or spring water produce different kinds.

Others think, that the waters of the sea, and the rivers, with those which fell from heaven, turned the whole surface of the earth upside down; after the same manner as the waters of the Loire, and other rivers, which roll in a sandy bottom, overturn all their sands, and even the earth itself, in their swellings and inundations; and that in this general subversion, the shells came to be interred here, fishes there, trees there, &c. See DELUGE.

Dr Woodward, in his Natural History of the Earth, pursuing and improving the hypothesis of Dr Burnet, maintains the whole mass of earth, with every thing belonging thereto, to have been so broken and dissolved at the time of the deluge, that a new earth was then formed on the bosom of the water, consisting of different strata, or beds of terrestrial matter, ranged over each other usually according to the order of their specific gravities. By this means, plants, animals, and especially fishes and shells, not yet dissolved among the rest, remained mixed and blended among the mineral and fossil matters; which preserved them, or at least assumed and retained their figures and impressions either indentedly, or in relieve.

See more on this subject under the article EARTH, *passim*. See also PETRIFICATIONS and STRATA.

FOSSILE Pitch. See PETROLEUM.

FOSTER (Dr James), a most distinguished and popular dissenting minister, born at Exeter in 1697. He began to preach in 1718; and strong disputes arising soon after, among the dissenters, concerning the Trinity and subscription to tests, his judgment determining him to the obnoxious opinions, the clamour grew loud against him, and occasioned more than one removal. His talents were hid among obscure country congregations, until 1724; when he was chosen to succeed Dr Gale in Barbican, where he laboured as pastor above 20 years. The Sunday evening-lecture, begun in the Old Jury meeting-house in 1728, and which he conducted with such uncommon applause for more than 20 years, indisputably showed his abilities as a preacher. Persons of all persuasions and ranks in life

flocked to hear him: and Mr Pope has honoured him with a commendatory couplet in his satires; which, however, his commentator laboured to destroy the intention of by a frivolous note. In 1746, he attended the unhappy lord Kilmarnock, at his execution on Tower-hill; an office which those who lived with him imagined made too deep an impression on his sympathizing spirit, as his vivacity abated from that time. He died in 1753; after having published several valuable compositions and sermons; particularly. 1. A Defence of Christianity, against Tindal's Christianity as old as the Creation. 2. An Essay on Fundamentals. 3. Four volumes of Sermons. 4. Discourses on Natural Religion and Social Virtue, in 4to.

FOSTER (Samuel), an ingenious English mathematician of the last century, and astronomical professor in Gresham college, was one of that learned association which met for cultivating the new philosophy during the political confusions, and which Charles II. established into the Royal Society. Mr Foster, however, died in 1652, before this incorporation took place; but wrote a number of mathematical and astronomical treatises, too many to particularize. There were two other mathematical students of this name; William Foster, a disciple of Mr Oughtred, who taught in London; and Mark Foster, author of a treatise on trigonometry, who lived later than the former two.

FOTHER, or FODDER, is a weight of lead, containing eight pigs, and every pig one and twenty stone and a half; so that it is about a ton or common cart-load. Among the plumbers in London, it is nineteen hundred and a half; and at the mines it is two and twenty hundred and a half. The word is of Teutonic origin, from *fuder*.

FOTHERGILL (Dr George), was born in Westmoreland in 1705, where his family had been long seated on a competent estate that had descended regularly for several generations. After an academical education in Queen's college, Oxford, of which he became a fellow, he was, in 1751, elected principal of St Edmund's-hall, and presented to the vicarage of Brumley in Hampshire. Having been long afflicted with an asthma, he died in 1760. He was the author of a collection of much esteemed sermons, in 2 vols 8vo. The first volume consists of occasional discourses, published by himself; the second printed from his MSS.

FOTHERGILL (Dr John), a late eminent physician, son of John and Margaret, quakers, was born in 1712, at Carr End in Yorkshire, where his father, who had been a brewer at Knaresborough (after having travelled from one end of America to the other), lived retired on a small estate which he cultivated. The Doctor was the second of five children (four sons and a daughter), and received his education under the care of his grandfather Thomas Hough, a person of fortune in Cheshire (which gave him a predilection for that county), and at Sedburg in Yorkshire. He afterwards served his time to one Mr Bartlett an apothecary at Bradford. From thence he removed to London, and became a pupil of Dr (afterwards Sir Edward) Wilmot at St Thomas's Hospital. He then went to the university of Edinburg to study physic, and took his doctor's degree there. From Edinburgh he went to Leyden: whence, after a short stay, he returned to London, and began to practise about the year 1740, in

Foster
Fothergill.

Fothergill. in a house in White-hart Court, Lombard-street, where he resided during the greatest part of his life, and acquired most of his fortune. In 1746, he was admitted a licentiate of the college of physicians in London; and in 1754 a fellow of that of Edinburgh, to which he was a considerable benefactor. He afterwards became a member of the Royal Medical Society at Paris, and a member both of the Royal and Antiquarian Societies. He continued his practice with uninterrupted success till within the last two years of his life, when the illness which he had brought on himself by unremitted attention, obliged him to give up a considerable part of it. Besides his application to medical science, he had imbibed an early taste for natural history, improved by his friend Peter Collinson, and employed himself on coquillage and smaller objects of botany. He was for many years a valuable contributor to the Gentleman's Magazine; where his observations on the weather and diseases were begun in April 1751, and discontinued in the beginning of 1756, being disappointed in his views of exciting other experienced physicians in different parts to imitate the example. He had very extensive practice, but he did not add to his art any great or various improvements. His pamphlet on the ulcerous sore throat is, on every account, the best of his publications; but owes much of its merit to the information of the late Dr Letherland. It was first printed in 1748, on the re-appearance of that fatal disorder which in 1739 had carried off the two only sons of Mr Pelham. In 1762 Dr Fothergill purchased an estate at Upton in Essex; and formed a botanic garden there, the second in Europe: Kew is the first. In 1766 he began regularly to withdraw, from Midsummer to Michaelmas, from the excessive fatigue of his profession, to Lee-Hall, near Middlewich, in Cheshire; which, though he only rented it by the year, he had spared no expence to improve. He took no fees during this recess, but attended to prescribe gratis at an inn at Middlewich once a-week. In 1767, after he found himself obliged to relax his attention to business, he removed from his house in the city, to reside in Harpur-street, Red-Lion Square. Some time before his death he had been industrious to contrive a method of generating and preserving ice in the West-Indies. He was the patron of Sidney Parkinson, and drew up the preface prefixed to his account of the voyage to the South Seas. At his expence also was made and printed an entire new translation of the whole Bible, from the Hebrew and Greek originals, by Anthony Purver, a quaker, in two volumes, 1764, folio, and also, in 1780, an edition of bishop Piercy's "Key to the New Testament," adapted to the use of a seminary of young Quakers, at Acworth, near Leeds in Yorkshire, founded in 1778 by the Society, who purchased, by a subscription in which Dr Fothergill stood foremost, the house and an estate of thirty acres which the Foundling Hospital held there, but which they found inconvenient for their purpose on account of distance. The Doctor himself first projected this on the plan of a smaller institution of the same kind at Gildersomes. He also endowed it handsomely by his will. It now contains above 300 children of both sexes, who are clothed and instructed. Among the other beneficent schemes suggested by Dr Fothergill were those of bringing fish to London by land car-

riage, which, though it did not in every respect succeed, Fothergill, tended to destroy a supposed combination; and of rendering bread much cheaper, though equally wholesome, to the poor, by making it with one part of potatoes and three parts of household flour. But his public benefactions, his encouragements of science, the instances of his attention to the health, the police, the convenience of the metropolis, &c. we cannot pretend to specify. The fortune which Dr Fothergill had acquired was immense; and, taking all things together, the house and moveables in Harpur-street, the property in Essex, and the estate in Cheshire (which he held on a lease), and his ready money, amounted to L. 80,000. His business when he was in full practice was calculated at near L. 7000 per annum. In the influenza of 1775 and 1776, he is said to have had 60 patients on his list daily, and his profit was estimated at L. 8000 per annum.

The disorder which hastened his death was a scirrhous of the prostata, and an obstruction in the bladder (in which were found after his death two quarts of water), which had been gradually coming on him for six years past, occasioned by a delicacy, which made him unwilling to alight from his carriage: and when, after his temporary recovery from it the year before he died, he submitted to use relief in his carriage, it was too late. He died at his house in Harpur-street, December 26. 1780; and his remains were interred, January 5. in the Quakers burying-ground at Winchmore-hill, whither they were accompanied by more than 70 coaches and post-chaises, notwithstanding the intention of the executors to have the funeral private. The Doctor by his will appointed, that his shells, and other pieces of natural history, should be offered to the late Dr Hunter at L. 500 under the valuation he ordered to be taken of them. Accordingly Dr Hunter bought them for L. 1200. The drawings and collections in natural history were also to be offered to Mr (now Sir Joseph) Banks at a valuation. His English portraits and prints, which had been collected by Mr John Nickolls of Ware, and purchased by him for 80 guineas, were bought for 200 guineas by Mr Thane. His books were sold by auction, April 30. 1781, and the eight following days. His house and garden at Upton, in which 15 men were constantly employed, were valued at L. 10,000. He spared no expence to augment this as well as his other collections. He had an ingenious artist qualified to collect for him at the Cape of Good Hope, and another on the Alps, and employed for several years before his death a painter in natural history at Leeds.

Dr Fothergill's character was excellent. A transaction, indeed, with regard to one Dr Leeds, gave occasion to some of his enemies to blame him; but how unjustly, has been abundantly shown by his biographers Dr Elliott and Dr Lettsome. Besides the pamphlet already mentioned, Dr Fothergill wrote a considerable number of Tracts, which are now collected into one volume 8vo, by Dr Elliott. He sometimes wrote in the newspapers, and is said to have been the author of more than 100 letters in the Gazetteer concerning the New Pavement.

FOTHERGILLA, in botany: A genus of the digynia order, belonging to the polyandria class of plants. The

Fothering
||
Foul.

The calyx is lobed, most entire; there is no corolla; the germen bifid; the capsule bilocular; and the cells two valved; the seeds solitary and bony.

FOTHERING, a peculiar method of endeavouring to stop a leak in the bottom of a ship while she is afloat, either under sail or at anchor. It is usually performed in the following manner: A basket is filled with ashes, cinders, and chopped rope-yarns, and loosely covered with a piece of canvas; to this is fastened a long pole, by which it is plunged repeatedly in the water, as close as possible to the place where the leak is conjectured to lie. The oakum or chopped rope-yarns being thus gradually shaken through the twigs, or over the top of the basket, are frequently sucked into the holes along with the water, so that the leak becomes immediately choked; and the future entrance of the water is thereby prevented.

FOTHERINGAY, a town of Northamptonshire, about four miles from Stamford, situated on the river Avon or Nen, and consisting of one street. Edward duke of York in the reign of Henry V. founded and endowed a fine collegiate church here, in which he was interred. At the dissolution the college and the choir were pulled down, and the bodies of the founder and his family left exposed till queen Elizabeth's time, who ordered them to be interred, and the present monuments to be erected. On the north side of the church is a free school, founded by Henry VII. or Edward VI. endowed with L.20 *per annum* for a master, payable out of the exchequer by the receiver of the county. The bridge over the river here was first built by queen Elizabeth, 1573, of timber, with three pillars upon the foundation. Daniel, first earl of Nottingham, and the other trustees for William Saville, marquis of Halifax, rebuilt it, in 1722, of freestone from King's Cliffe. On the south-east side of the Cliffe stood the castle; which was of great antiquity and considerable strength. Mary queen of Scots, who had been in the custody of Sir Amias Powlet here, was tried and beheaded in the hall; and her son afterwards, forgiving and even taking into favour her greatest enemy Cecil, only took the childish revenge of beating down the castle; which he so completely demolished, that no more than the earthworks now remain. Within the first work is a farm-house with some carved stones wrought into it, and at the south-west corner of the inner trench are some masses of stone-walls. Sir Robert Cotton carried the wain-scot of the hall to Connington.

FOU-TCHEOU, a city of China, in the province of FO-KIEN. It carries on a considerable trade; but is chiefly remarkable for the magnificence of its principal bridge, which has more than 100 arches, constructed of white stone, and ornamented with a double balustrade throughout. This city is the residence of a viceroy, and has under its jurisdiction nine cities of the third class.

FOUGADE, or **FOUGASSE**, in the art of war, a little mine, about 8 or 10 feet wide, and 10 or 12 deep, dug under some work or post, which is in danger of falling into the enemy's hands; and charged with sacks of powder, covered with stones, earth, and whatever else can make great destruction. It is set on fire like other mines, with a faucisse. See **MINE**.

FOUL, or **FOULE**, in the sea-language, is used when a ship has been long untrimmed, so that the

grass-weeds, or barnacles, grow to her sides under water. A rope is also foul when it is either tangled in itself, or hindered by another, so that it cannot run or be over-hauled.

FOUL imports, also, the running of one ship against another. This happens sometimes by the violence of the wind, and sometimes by the carelessness of the people on board, to ships in the same convoy, and to ships in port by means of others coming in. The damages occasioned by running foul, are of the nature of those in which both parties must bear a share. They are usually made half to fall upon the sufferer, and half upon the vessel which did the injury: but in cases where it is evidently the fault of the master of the vessel, he alone is to bear the damage.

FOUL-Water. A ship is said to make foul-water, when, being under sail, she comes into such shoal-water, that though her keel does not touch the ground, yet it comes so near it, that the motion of the water under her raises the mud from the bottom.

FOUL is also a disease in cattle, proceeding from blood, and a waterish rheum that falls down into the legs, and makes them swell.

FOUL or **Pimpled Face**. See **CUTIS ROSACEA**.

FOULA, or **Foul Island**, one of the Shetland isles, lying between six and seven leagues west from the main land. It is about three miles long, narrow, and full of rough, steep, and bare rocks; one of which is so large, and runs up to such an height, that it may be clearly seen from Orkney. This, therefore, may be reckoned with the greatest probability to be the Thule of Tacitus, whatever might be the Thule of the Phenicians and Greeks. It has scarce any pasturage, and but very little arable land; but that, however small in extent, is very fertile, out of the produce of which, with fowl and fish, the poor inhabitants subsist. They have nothing that can be called a port; and the only commodities they have are stock-fish, train-oil, and feathers.

FOUMART, in zoology, a species of **MUSTELA**.

FOUNDATION, in architecture, is that part of a building which is under-ground. See **ARCHITECTURE**, n° 96 *et seq.* and n° 130, &c.

Palladio allows a sixth part of the height of the whole building for the hollowing or under-digging; unless there be cellars under ground, in which case he would have it somewhat lower.

FOUNDATION, denotes also a donation or legacy, either in money or lands, for the maintenance and support of some community, hospital, school, &c.

The king only can found a college, but there may be a college in reputation founded by others. If it cannot appear by inquiry who it was that founded a church or college, it shall be intended that it was the king, who has power to found a new church, &c. The king may found and erect an hospital, and give a name to the house upon the inheritance of another, or license another person to do it upon his own lands; and the words *fundo, creo*, &c. are not necessary in every foundation, either of a college or hospital, made by the king; but it is sufficient if there be words equivalent: the incorporation of a college or hospital is the very foundation; but he who endows it with lands is the founder; and to the erection of an hospital, nothing more is requisite but the incorporation and foundation.

Persons

Foul
||
Founda-
tion.

Jacob's
Law Dict.

Founder, Persons seized of estates in fee-simple, may erect and found hospitals for the poor by deed enrolled in chancery, &c. which shall be incorporated, and subject to such visitors as the founder shall appoint, &c. stat. 39 Eliz. c. 5.

FOUNDER, in a general sense, the person who lays a foundation, or endows a church, school, religious house, or other charitable institution. See **FOUNDATION**.

FOUNDER, also implies an artist who casts metals, in various forms, for different uses, as guns, bells, statues printing-characters, candlesticks, buckles, &c. whence they are denominated gun-founders, bell-founders, figure-founders, letter-founders, founders of small works, &c. See **FOUNDRY**.

FOUNDER, in the sea language: A ship is said to founder, when by an extraordinary leak, or by a great sea breaking in upon her, she is so filled with water, that she cannot be freed of it; so that she can neither veer nor steer, but lie like a log; and not being able to swim long, will at last sink.

FOUNDERED, in farriery. See there, § xli.

FOUNDRY, or **FOUNDRIE,** the art of casting all sorts of metals into different forms. It likewise signifies the work-house or smelting-hut wherein these operations are performed.

FOUNDRY of Small Works, or Casting in Sand. The sand used for casting small-works is at first of a pretty soft, yellowish, and clammy nature: but it being necessary to strew charcoal-dust in the mould, it at length becomes of a quite black colour. This sand is worked over and over, on a board, with a roller, and a sort of knife; being placed over a trough to receive it, after it is by these means sufficiently prepared.

This done, they take a wooden board of a length and breadth proportional to the things to be cast, and putting a ledge round it, they fill it with sand, a little moistened, to make it duly cohere. Then they take either wood or metal models of what they intend to cast, and apply them so to the mould, and press them into the sand, as to leave their impression there. Along the middle of the mould is laid half a small brass cylinder, as the chief canal for the metal to run through, when melted, into the models or patterns; and from this chief canal are placed several others which extend to each model or pattern placed in the frame. After the frame is finished, they take out the patterns, by first loosening them all round, that the sand may not give way.

Then they proceed to work the other half of the mould with the same patterns in just such another frame only that it has pins, which entering into holes that correspond to it in the other, make the two cavities of the pattern fall exactly on each other.

The frame, thus moulded, is carried to the melter; who after extending the chief canal of the counter-part, and adding the cross canals to the several models in both, and strewing mill dust over them, dries them in a kind of oven for that purpose.

Both parts of the mould being dry, they are joined together by means of the pins; and to prevent their giving way, by reason of the melted metal passing thro' the chief cylindrical canal, they are screwed or wedged up like a kind of press.

While the moulds are thus preparing, the metal is

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fusing in a crucible of a size proportionate to the quantity of metal intended to be cast. **Foundry.**

When the moulds are coolish, the frames are unscrewed, or unwedged, and the cast work taken out of the sand, which sand is forked over again for other castings.

FOUNDRY of Statues. The casting of statues depends on the due preparation of the pit, the core, the wax, the outer mould, the inferior furnace to melt off the wax, and the upper to fuse the metal. The pit is a hole dug in a dry place something deeper than the intended figure, and made according to the prominence of certain parts thereof. The inside of the pit is commonly lined with stone, or brick; or, when the figure is very large, they sometimes work on the ground, and raise a proper fence to resist the impulsion of the melted metal.

The inner mould, or core, is a rude mass to which is given the intended attitude and contours. It is raised on an iron grate, strong enough to sustain it, and is strengthened within by several bars of iron. It is generally made either of potter's clay, mixed with hair and horse-dung; or of plaster of Paris mixed with brick dust. The use of the core is to support the wax, the shell, and lessen the weight of the metal. The iron bars and the core are taken out of the brass figure through an aperture left in it for that purpose, which is soldered up afterwards. It is necessary to leave some of the iron bars of the core, that contribute to the steadiness of the projecting part, within the brass figure.

The wax is a representation of the intended statue. If it be a piece of sculpture, the wax should be all of the sculptor's own hand, who usually forms it on the core: Though it may be wrought separately in cavities, moulded on a model, and afterwards arranged on the ribs of iron over the grate; filling the vacant space in the middle with liquid plaster and brickdust, whereby the inner core is proportioned as the sculptor carries on the wax.

When the wax, which is the intended thickness of the metal, is finished, they fill small waxen tubes perpendicular to it from top to bottom, to serve both as canals for the conveyance of the metal to all parts of the work; and as vent-holes, to give passage to the air which would otherwise occasion great disorder when the hot metal came to encompass it.

The work being brought thus far, must be covered with its shell, which is a kind of crust laid over the wax, and which being of a soft matter, easily receives the impression of every part, which is afterwards communicated to the metal upon its taking the place of the wax, between the shell and the mould. The matter of this outer mould is varied according as different layers are applied. The first is generally a composition of clay, and old white crucibles well ground and sifted, and mixed up with water to the consistence of a colour fit for painting: accordingly they apply it with a pencil, laying it seven or eight times over, and letting it dry between whites. For the second impression, they add horse-dung and natural earth to the former composition. The third impression is only horse-dung and earth. Lastly, the shell is finished, by laying on several more impressions of this last matter, made very thick with the hand.

The shell, thus finished, is secured by several iron girths,

3 B

Foundry. girths, bound round it, at about half a foot distance from each other, and fastened at the bottom to the grate under the statue, and at the top to a circle of iron where they all terminate.

If the statue be so big that it would not be easy to move the moulds with safety, they must be wrought on the spot where it is to be cast. This is performed two ways: in the first, a square hole is dug under ground, much bigger than the mould to be made therein, and its inside lined with walls of free-stone or brick. At the bottom is made a hole of the same materials, with a kind of furnace, having its aperture outwards: in this is a fire made to dry the mould, and afterwards, melt the wax. Over this furnace is placed the grate, and upon this the mould, &c. formed as above. Lastly, at one of the edges of the square pit is made another large furnace to melt the metal. In the other way, it is sufficient to work the mould above ground, but with the like precaution of a furnace and grate underneath. When finished, four walls are to be run around it, and by the side thereof a massive made for a melting-furnace. For the rest the method is the same in both. The mould being finished, and inclosed as described, whether under ground or above it, a moderate fire is lighted in the furnace under it, and the whole covered with planks that the wax may melt gently down, and run out at pipes contrived for that purpose, at the foot of the mould, which are afterwards exactly closed with earth, so soon as the wax is carried off. This done, the hole is filled up with bricks thrown in at random, and the fire in the furnace augmented till such time as both the bricks and mould become red hot. After this the fire being extinguished, and every thing cold again, they take out the bricks, and fill up their place with earth moistened, and a little beaten to the top of the mould, in order to make it the more firm and steady. These preparatory measures being duly taken, there remains nothing but to melt the metal, and run it into the mould. This is the office of the furnace above described, which is commonly made in the form of an oven with three apertures, one to put in the wood, another for a vent, and a third to run the metal out at. From this last aperture, which is kept very close, while the metal is in fusion, a small tube is laid, whereby the melted metal is conveyed into a large earthen basin over the mould, into the bottom of which all the big branches of the jets or casts, which are to convey the metal into all the parts of the mould, are inserted.

These casts or jets are all terminated with a kind of plugs, which are kept close, that, upon opening the furnace, the brass, which gushes out with violence may not enter any of them, till the basin be full enough of matter to run into them all at once. Upon which occasion they pull out the plugs, which are long iron rods, with a head at one end, capable of filling the whole diameter of each tube. The whole of the furnace is opened with a long piece of iron fitted at the end of each pole, and the mould filled in an instant. This completes the work in relation to the casting part; the rest being a sculptor's or carver's business, who taking the figure out of the mould and earth wherewith it is encompassed, saws off the jets with which it appears covered over, and repairs it with chisels, gravers, punchcons, &c.

Foundry of Bells. The metal, it is to be observed, is different for bells from what its for statues; there being no tin in the statue-metal: but there is a fifth, and sometimes more, in the bell-metal.

The dimensions of the core and the wax for bells, if a ring of bells especially, are not left to chance, but must be measured on a scale, or diapason, which gives the height, aperture, and thickness necessary for the several tones required.

It is on the wax that the several mouldings and other ornaments and inscriptions, to be represented in relief on the outside of the bell, are formed. The clapper or tongue is not properly a part of the bell, but is furnished from other hands. In Europe, it is usually of iron, with a large knob at the extreme; and is suspended in the middle of the bell. In China, it is only a huge wooden mallet, struck by force of arm against the bell; whence they can have but little of that consonancy so much admired in some of our rings of bells. The Chinese have an extraordinary way of increasing the sound of their bells; viz. by leaving a hole under the cannon; which our bell-founders would reckon a defect.

The proportions of our bells differ very much from those of the Chinese. In ours, the modern proportions are, to make the diameter 15 times the thickness of the brim, and the height 12 times. The parts of a bell are, 1. The sounding bow, terminated by an inferior circle, which grows thinner and thinner. 2. The brim or that part of a bell whereon the clapper strikes, and which is thicker than the rest. 3. The outward sinking of the middle of the bell, or the point under which it grows wider to the brim. 4. The waist or furniture, and the part that grows wider and thicker quite to the brim. 5. The upper vase, or that part which is above the waist. 6. The pallet which supports the staple of the clapper within. 7. The bent and hollowed branches of metal uniting with the cannons, to receive the iron keys, whereby the bell is hung up to the beam, which is its support and counterpoise, when rung out.

The business of bell-foundry is reducible to three particulars. 1. The proportion of a bell. 2. The forming of the mould. And, 3. The melting of the metal. There are two kinds of proportions, viz. the simple and the relative; the former are those proportions only that are between the several parts of a bell to render it sonorous; the relative proportions establish a requisite harmony between several bells.

The method of forming the profile to a bell, previous to its being cast, in which the proportion of the several parts may be seen, is as follows: the thickness of the brim, *CI* (Plate CXCIV.) is the foundation of every other measure, and is divided into three equal parts. First, draw the line *HD*, which represents the diameter of the bell; bisect it in *F* and erect the perpendicular *Ff*; let *DF* and *HF* be also bisected in *E* and *G*, and two other perpendiculars *Ee*, or *Gg*, be erected at *E* and *G*: *GE* will be the diameter of the top or upper vase, i. e. the diameter of the top will be half that of the bell; and it will therefore, be the diameter of a bell which will sound an octave to the other. Divide the diameter of the bell or the line *HD* into 15 equal parts, and one of these will give *CI* the thickness of the brim; divide again each of these

Foundery these 15 equal parts into three other equal parts, and then form a scale. From this scale take 12 of the larger divisions or $\frac{1}{3}$ of the whole scale in the compass, and setting one leg in D describe an arc to cut the line E e in N; draw N D, and divide this line into 12 equal parts; at the point 1 erect the perpendicular $1C=10$, and C1 will be the thickness of the brim $=\frac{1}{3}$ of the diameter: draw the line C D: bisect DN; and at the point of bisection 6 erect the perpendicular $6K=\frac{1}{3}$ of the larger divisions on the scale. With an opening of the compass equal to twice the length of the scale or 30 brims, setting one leg in N, describe an arc of a circle, and with the same leg in K and the same opening describe another arc to intersect the former: on this point of intersection as a centre, and with a radius equal to 30 brims, describe the arc NK; in 6 K produced take $KB=\frac{1}{3}$ of the larger measure of the scale or $\frac{1}{3}$ of the brim, and on the same centre with the radius 30 $\frac{1}{3}$ brims describe an arc AB parallel to NK. For the arc BC, take 12 divisions of the scale or 12 brims in the compass; find a centre, and from that centre, with this opening, describe the arc BC, in the same manner as NK or AB were described. There are various ways of describing the arc K p; some describe it on a centre at the distance of nine brims from the points p and K; others, as it is done in the figure, on a centre at the distance only of seven brims from those points. But it is necessary first to find the point p, and to determine the rounding of the bell p 1. For this purpose, on the point C as a centre, and with the radius C 1, describe the arc 1 p n; bisect the part 1, 2 of the line D n, and erecting the perpendicular p m, this perpendicular will cut the arc 1 p n in m, which terminates the rounding 1 p. Some founders make the bendings K a third of a brim lower than the middle of the line D N; others make the part C 1 D more acute, and instead of making C 1 perpendicular to DN at 1, draw it $\frac{1}{3}$ th of a brim higher, making it still equal to one brim; so that the line 1 D is longer than the brim C 1. In order to trace out the top-part N a, take in the compass eight divisions of the scale or eight brims, on the points N and D as centres, describe arcs to intersect each other in 8: on this point 8, with a radius of eight brims, describe the arc N b; this arc will be the exterior curve of the top or crown: on the same point 8 as a centre, and with a radius equal to 7 $\frac{1}{3}$ brims, describe the arc A e, and this will be the interior curve of the crown, and its whole thickness will be one third of the brim. As the point 8 does not fall in the axis of the bell, a centre M may be found in the axis by describing, with the interval of eight brims on the centres D and H, arcs which will intersect in M; and this point may be made the centre of the inner and outer curves of the crown as before. The thickness of the cap which strengthens the crown at Q is about one third of the thickness of the brim; and the hollow branches or ears about one-sixth of the diameter of the bell. The height of the bell is in proportion to its diameter as 12 to 15, or in the proportion of the fundamental sound to its third major: whence it follows, that the sound of a bell is principally composed of the sound of its extremity or brim as a fundamental of the sound of the crown, which is an octave to it, and of that of the height which is a third.

The particulars necessary for making the mould of

a bell are, 1. The earth: the most cohesive is the **Foundery** best; it must be well ground and sifted, to prevent any chinks. 2. Brick-stone; which must be used for the mine, mould, or core, and for the furnace. 3. Horse-dung, hair, and hemp, mixed with the earth, to render the cement more binding. 3. The wax for inscriptions, coats of arms, &c. 5. The tallow equally mixed with the wax, in order to put a slight lay of it upon the outer mould, before any letters are applied to it. 6. The coals to dry the mould.

For making the mould, they have a scaffold consisting of four boards, ranged upon tressels. Upon this they carry the earth, grossly diluted, to mix it with horse-dung, beating the whole with a large spatula.

The compasses of construction is the chief instrument for making the mould, which consist of two different legs joined by a third piece. And last of all, the founders shelves, on which are the engravings of the letters, cartridges, coats of arms, &c.

They first dig a hole of a sufficient depth to contain the mould of the bell, together with the case or cannon, under ground; and about six inches lower than the terreplain, where the work is performed. The hole must be wide enough for a free passage between the mould and walls of the hole, or between one mould and another, when several bells are to be cast. At the centre of the hole is a stake erected, that is strongly fastened in the ground. This supports an iron peg, on which the pivot of the second branch of the compasses turns. The stake is encompassed with a solid brick-work, perfectly round, about half a foot high, and of the proposed bell's diameter. This they call a *mill-stone*. The parts of the mould are, the core, the model of the bell, and the shell. When the outer surface of the core is formed, they begin to raise the core, which is made of bricks that are laid in courses of equal height upon a lay of plain earth. At the laying of each brick, they bring near it the branch of the compasses, on which the curve of the core is shaped, so as that there may remain between it and the curve the distance of a line, to be afterwards filled up with layers of cement. The work is continued to the top, only leaving an opening for the coals to bake the core. This work is covered with a layer of cement, made of earth and horse-dung; on which they move the compasses of construction, to make it of an even smoothness every where.

The first layer being finished, they put the fire to the core, by filling it half with coals, through an opening that is kept shut, during the baking, with a cake of earth that has been separately baked. The first consumes the stake, and the fire is left in the core half or sometimes a whole day: the first layer being thoroughly dry, they cover it with a second, third, and fourth; each being smoothed by the board of the compasses, and thoroughly dried before they proceed to another.

The core being completed, they take the compasses to pieces, with intent to cut off the thickness of the model, and the compasses are immediately put in their place to begin a second piece of the mould. It consists of a mixture of earth and hair, applied with the hand on the core, in several cakes that close together. This work is finished by several layers of a thinner cement of the same matter, smoothed by the compasses,

Foundry. and thoroughly dried before another is laid on. The first layer of the model is a mixture of wax and grease spread over the whole. After which are applied the inscriptions, coats of arms, &c. besmeared with a pencil dipped in a vessel of wax in a chafing-dish: this is done for every letter. Before the shell is begun, the compasses are taken to pieces, to cut off all the wood that fills the place of the thickness to be given to the shell.

The first layer is the same earth with the rest, sifted very fine; whilst it is tempering in water, it is mixed with cow's hair to make it cohere. The whole being a thin cullis, is gently poured on the model, that fills exactly all the sinuosities of the figures, &c. and this is repeated till the whole is two lines thick over the model. When this layer is thoroughly dried, they cover it with a second of the same matter, but somewhat thicker; when this second layer becomes of some consistence, they apply the compasses again, and light a fire in the core, so as to melt off the wax of the inscriptions, &c.

After this, they go on with other layers of the shell, by means of the compasses. Here they add to the cow's hair a quantity of hemp, spread upon the layers, and afterwards smoothed by the board of the compasses. The thickness of the shell comes to four or five inches lower than the mill-stone before observed, and surrounds it quite close, which prevents the extravasation of the metal. The wax should be taken out before the melting of the metal.

The ear of the bell requires a separate work, which is done during the drying of the several incrustations of the cement. It has seven rings: the seventh is called the *bridge*, and unites the others, being a perpendicular support to strengthen the curves. It has an aperture at the top, to admit a large iron peg, bent at the bottom; and this is introduced into two holes in the beam, fastened with two strong iron keys. There are models made of the rings, with masses of beaten earth, that are dried in the fire, in order to have the hollow of them. Those rings are gently pressed upon a layer of earth and cow's hair, one half of its depth; and then taken out, without breaking the mould. This operation is repeated 12 times for 12 half-moulds, that two and two united may make the hollows of the six rings; the same they do for the hollow of the bridge, and bake them all, to unite them together.

Upon the open place left for the coals to be put in, are placed the rings that constitute the ear. They first put into this open place the iron-ring to support the clapper of the bell; then they make a round cake of clay, to fill up the diameter of the thickness of the core. This cake, after baking, is clapped upon the opening, and soldered with a thin mortar spread over it, which binds the cover close to the core.

The hollow of the model is filled with an earth, sufficiently moist to fix on the place, which is strewed at several times upon the cover of the core; and they beat it gently with a pestle, to a proper height; and a workman smooths the earth at top with a wooden trowel dipped in water.

Upon this cover, to be taken off afterwards, they assemble the hollows of the rings. When every thing is in its proper place, they strengthen the outside of the hollows with mortar, in order to bind them with the

bridge, and keep them steady at the bottom, by means of a cake of the same mortar, which fills up the whole aperture of the shell. This they let dry, that it may be removed without breaking. To make room for the metal, they pull off the hollows of the rings, through which the metal is to pass, before it enters into the cavity of the mould. The shell being unloaded of its ear, they range under the millstone five or six pieces of wood, about two feet long, and thick enough to reach almost the lower part of the shell; between these and the mould, they drive in wooden wedges with a mallet, to shake the shell of the model whereon it rests, so as to be pulled up and got out of the pit.

When this and the wax are removed, they break the model and the layer of earth, through which the metal must run, from the hollow of the rings, between the shell and the core. They smoke the inside of the shell, by burning straw under it, that helps to smooth the surface of the bell. Then they put the shell in the place, so as to leave the same interval between that and the core; and before the hollows of the rings or the cap are put on again, they add two vents, that are united to the rings, and to each other, by a mass of baked cement. After which they put on this mass of the cap, the rings, and the vent, over the shell, and solder it with thin cement, which is dried gradually by covering it with burning coals. Then they fill up the pit with earth, beating it strongly all the time round the mould.

The furnace has a place for the fire, and another for the metal. The fire-place has a large chimney with a spacious ash-hole. The furnace which contains the metal is vaulted, whose bottom is made of earth, rammed down; the rest is built with brick. It has four apertures; the first, through which the flame reverberates; the second is closed with a stopple that is opened for the metal to run; the others are to separate the dross or scoriæ of the metal by wooden rakes: through these last apertures passes the thick smoke. The ground of the furnace is built sloping, for the metal to run down.

Foundry of Great Guns and Mortar-Pieces. The method of casting these pieces is little different from that of bells: they are run massy, without any core, being determined by the hollow of the shell: and they are afterwards bored with a steel trepan, that is worked either by horses or a water-mill.

For the metal, parts, proportions, &c. of these pieces, see *GUNNERY*.

Letter-Foundry, or Casting of Printing Letters.

In the business of cutting, casting, &c. letters for printing, the letter-cutter must be provided with a vice, hand-vice, hammers, and files of all sorts for watch-makers use; as also gravers and sculptors of all sorts, and an oil-stone, &c. suitable and sizeable to the several letters to be cut: a flat gage made of box to hold a rod of steel, or the body of a mould, &c. exactly perpendicular to the flat of the using file: a sliding-gage whose use is to measure and set off distances between the shoulder and the tooth, and to mark it off from the end, or from the edge of the work: a face gage, which is a square notch cut with a file into the edge of a thin plate of steel, iron, or brass, of the thickness of a piece of common tin, whose use is to proportion the face of each sort of letter, viz. long letters, ascending

Foundery. cending letters, and short letters. So there must be three gages, and the gage for the long letters is the length of the whole body supposed to be divided into 42 equal parts. The gage for the ascending letters Roman and Italic are $\frac{1}{2}$, or 30 parts of 42, and 33 parts for the English face. The gage for the short letters is $\frac{1}{3}$, or 18 parts of 42 of the whole body for the Roman and Italic, and 22 parts for the English face.

The Italic and other standing gages are to measure the scope of the Italic stems, by applying the top and bottom of the gage to the top and bottom lines of the letters, and the other side of the gage to the stem; for when the letter complies with these three sides of the gage, that letter has its true shape.

The next care of the letter-cutter is to prepare good steel punches, well tempered, and quite free from all veins of iron; on the face of which he draws or marks the exact shape of the letter with pen and ink if the letter be large, or with a smooth blunted point of a needle if it be small; and then with sizeable and proper shaped and pointed gravers and sculpters, digs or sculps out the steel between the strokes or marks he made on the face of the punch, and leaves the marks standing on the face. Having well shaped the inside strokes of his letter, he deepens the hollows with the same tools; for if a letter be not deep in proportion to its width, it will, when used at press, print black, and be good for nothing. This work is generally regulated by the depth of the counter-punch. Then he works the outside with proper files till it be fit for the matrice.

But before we proceed to the sinking and justifying of the matrices, we must provide a mould to justify them by, of which you have a draught in Plate CXC. fig. 1. 2.

Every mould is composed of an upper and an under part. The under part is delineated in fig. 1. The upper part is marked fig. 2. and is in all respects made like the under part, excepting the stool behind, and the bow or spring also behind; and excepting a small roundish wire between the body and carriage, near the break, where the under part hath a small rounding groove made in the body. This wire, or rather half-wire, in the upper part makes the nick in the shank of the letter, when part of it is received into the groove in the under part. These two parts are so exactly fitted and gaged into one another (*viz.* the male-gage marked *c* in fig. 2. into the female marked *g* in fig. 1. that when the upper part of the mould is properly placed on, and in the under part of the mould, both together make the entire mould, and may be slid backwards for use so far, till the edge of either of the bodies on the middle of either carriage comes just to the edge of the female gages cut in each carriage: and they may be slid forward so far, till the bodies on either carriage touch each other: and the sliding of these two parts of the mould backwards makes the shank of the letter thicker, because the bodies in each part stand wider asunder; and the sliding them forwards makes the shank of the letter thinner, because the bodies on each part of the mould stand closer together. The parts of the mould are as follow: *viz.* *a*, The carriage. *b*, The body. *c*, The male gage. *d*, *e*, The mouth-piece. *f*, The register. *g*, The female gage. *h*, The hag. *a a a a*, The bottom plate. *b b b*, The wood on which

the bottom plate lies. *ccc*, The mouth. *dd*, The Foundery. throat. *edd*, The pallat. *f*, The nick. *gg*, The stool. *hh*, The spring or bow.

Then the mould must be justified: and first the founder justifies the body, by casting about 20 proofs or samples of letters; which are set up in a composing stick, with all their nicks towards the right hand; and then by comparing these with the pattern letters, set up in the same manner, he finds the exact measure of the body to be cast. He also tries if the two sides of the body are parallel, or that the body be no bigger at the head than at the foot, by taking half the number of his proofs and turning them with their heads to the feet of the other half; and if then the heads and the feet be found exactly even upon each other, and neither to drive out or get in, the two sides may be pronounced parallel. He farther tries whether the two sides of the thickness of the letter be parallel, by first setting his proofs in the composing stick with their nicks upwards, and then turning one half with their head to the feet of the other half; and if the heads and feet lie exactly upon each other, and neither drive out nor get in, the two sides of the thickness are parallel.

The mould thus justified, the next business is to prepare the matrices. A matrice is a piece of brass or copper of about an inch and a half long, and of a thickness in proportion to the size of the letter it is to contain. In this metal is sunk the face of the letter intended to be cast, by striking the letter punch about the depth of an *n*. After this, the sides and face of the matrice must be justified and cleared with files of all bunchings made by sinking the punch.

Every thing thus prepared, it is brought to the furnace; which is built of brick upright, with four square sides, and a stone on the top, in which stone is a wide round hole for the pan to stand in. A foundery of any consequence has several of these furnaces in it.

As to the metal of which the types are to be cast, this, in extensive founderies, is always prepared in large quantities; but cast into small bars, of about 20 pounds weight, to be delivered out to the workmen as occasion requires. In the letter foundery which has been long carried on with reputation under the direction of Dr Alex. Wilson and sons at Glasgow, we are informed, that a stock of metal is made up at two different times of the year, sufficient to serve the casters at the furnace for six months each time. For this purpose, a large furnace is built under a shade, furnished with a wheel vent, in order the more equally to heat the sides of a strong pot of cast-iron, which holds when full fifteen hundred weight of the metal. The fire being kindled below, the bars of lead are let softly down into the pot, and their fusion promoted by throwing in some pitch and tallow, which soon inflame. An outer chimney, which is built so as to project about a foot over the farthest lip of the pot, catches hold of the flame by a strong draught, and makes it act very powerfully in melting lead; whilst it serves at the same time to convey away all the fumes, &c. from the workmen, to whom this laborious part of the business is committed. When the lead is thoroughly melted, a due proportion of the regulus of antimony and other ingredients are put in, and some more tallow is inflamed to make the whole incorporate sooner. The workmen now having mixed the contents of the pot very thoroughly

Foundery. roughly by stirring long with a large iron ladle, next proceed to draw the metal off into the small troughs of cast-iron, which are ranged to the number of four-score upon a level platform faced with stone, built towards the right hand. In the course of a day 15 hundred weight of metal can be easily prepared in this manner; and the operation is continued for as many days as are necessary to prepare a stock of metal of all the various degrees of hardness. After this, the whole is disposed into presses according to its quality, to be delivered out occasionally to the workmen.

The founder must now be provided with a ladle, which differs nothing from other iron ladles but in its size; and he is provided always with ladles of several sizes, which he uses according to the size of the letters he is to cast. Before the caster begins to cast, he must kindle his fire in the furnace to melt the metal in the pan. Therefore he takes the pan out of the hole in the stone, and there lays in coals and kindles them; and, when they are well kindled, he sets the pan in again, and puts in metal into it to melt: if it be a small-bodied letter he casts, or a thin letter of great bodies, his metal must be very hot; nay sometimes red-hot, to make the letter come. Then having chosen a ladle that will hold about so much as the letter and break is, he lays it at the stoking-hole, where the flame bursts out, to heat. Then he ties a thin leather, cut with its narrow end against the face to the leather groove of the matrice, by whipping a brown thread twice about the leather-groove, and fastening the thread with a knot. Then he puts both halves of the mould together, and puts the matrice into the matrice-cheek, and places the foot of the matrice on the stool of the mould, and the broad end of the leather upon the wood of the upper half of the mould, but not tight up, lest it might hinder the foot of the matrice from sinking close down upon the stool in a train of work. Then laying a little rosin on the upper wood of the mould, and having his casting-ladle hot, he with the boiling side of it melts the rosin; and, when it is yet melted, presses the broad end of the leather hard down on the wood, and so fastens it to the wood; all this is the preparation.

Now he comes to casting. Wherefore, placing the under half of the mould in his left hand, with the hook or hag forward, he clutches the ends of its wood between the lower part of the ball of his thumb and his three hind fingers; then he lays the upper half of the mould upon the under half, so that the male gages may fall into the female gages, and at the same time the foot of the matrice places itself upon the stool; and, clasping his left-hand thumb strong over the upper half of the mould, he nimbly catches hold of the bow or spring with his right-hand fingers at the top of it, and his thumb under it, and places the point of it against the middle of the notch in the backside of the matrice, pressing it as well forwards towards the mould, as downwards by the shoulder of the notch close upon the stool, while at the same time with his hinder fingers, as aforesaid, he draws the under half of the mould towards the ball of his thumb, and thrusts by the ball of his thumb the upper part towards his fingers, that both the registers of the mould may press against both sides of the matrice, and his thumb and fingers press both halves of the mould close together.

Then he takes the handle of his ladle in his right hand, and with the boll of it gives a stroke, two or three, outwards upon the surface of the melted metal, to scum or clear it from the film or dust that may swim upon it; then takes up the ladle full of metal, and having his mould, as aforesaid, in his left hand, he a little twists the left side of his body from the furnace, and brings the geat of his ladle (full of metal) to the mouth of the mould, and twists the upper part of his right hand towards him to turn the metal into it, while at the same moment of time he jilts the mould in his left hand forwards, to receive the metal with a strong shake (as it is called), not only into the body of the mould, but while the metal is yet hot running, swift and strongly, into the very face of the matrice, to receive its perfect form there, as well as in the shank.

Then he takes the upper half of the mould off the under half, by placing his right-hand thumb on the end of the wood next his left-hand thumb, and his two middle-fingers at the other end of the wood; and finding the letter and break lie in the under half of the mould (as most commonly by reason of its weight it does), he throws or tosses the letter, break and all, upon a sheet of waste paper laid for that purpose on the bench, just a little beyond his left hand, and is then ready to cast another letter as before; and also, the whole number that is to be cast with that matrice. A workman will ordinarily cast about three thousand of these letters in a day.

When the casters at the furnace have got a sufficient number of types upon the tables, a set of boys come and nimbly break away the jets from them: the jets are thrown into the pots, and the types are carried away in parcels to other boys, who pass them swiftly under their fingers, defended by leather, upon smooth flat stones, in order to polish their broad-sides. This is a very dexterous operation, and is a remarkable instance of what may be effected by the power of habit and long practice; for these boys, in turning up the other side of the type, do it so quickly by a mere touch of the fingers of the left hand, as not to require the least perceptible intermission in the motion of the right hand upon the stone. The types, thus finely smoothed and flattened on the broad-sides, are next carried to another set of boys, who sit at a square table, two on each side, and there are ranged up on long rulers or sticks, fitted with a small projection, to hinder them from sliding off backwards. When these sticks are so filled, they are placed, two and two, upon a set of wooden pins fixed into the wall, near the dresser, sometimes to the amount of an hundred, in order to undergo the finishing operations. This workman, who is always the most expert and skilful in all the different branches carried on at the foundery, begins by taking one of these sticks, and, with a peculiar address, slides the whole column of types off upon the dressing-stick: this is made of well-seasoned mahogany, and furnished with two end-pieces of steel, a little lower than the body of the types, one of which is moveable, so as to approach the other by means of a long screw-pin, inserted in the end of the stick. The types are put into this stick with their faces next to the back or projection; and after they are adjusted to one another so as to stand even, they are then bound up, by screwing home the moveable end-piece. It is here where the
great

Foundery

Foundry. great and requisite accuracy of the moulds come to be perceived; for in this case the whole column, so bound up, lies flat and true upon the stick, the two extreme types being quite parallel, and the whole has the appearance of one solid continuous plate of metal. The least inaccuracy in the exact parallelism of the individual type when multiplied so many times, would render it impossible to bind them up in this manner, by disposing them to rise or spring from the stick by the smallest pressure from the screw. Now, when lying so conveniently with the narrow edges uppermost, which cannot possibly be smoothed in the manner before mentioned by the stones, the workman does this more effectually by scraping the surface of the column with a thick-edged but sharp razor, which at every stroke brings on a very fine smooth skin, like to polished silver; and thus he proceeds till in about half a minute he comes to the farther end of the stick. The other edges of the types are next turned upwards, and polished in the same manner. It is whilst the types thus lie in the dressing-stick that the operation of bearding or barbing is performed, which is effected by running a plane, faced with steel, along the shoulder of the body next to the face, which takes more or less off the corner, as occasion may require. Whilst in the dressing-stick they are also grooved, which is a very material operation. In order to understand this, it must be remembered, that when the types are first broken off from the jets, some superfluous metal always remains, which would make them bear very unequally against the paper whilst under the printing-press, and effectually mar the impression. That all these inequalities may, therefore, be taken away, and that the bearings of every type may be regulated by the shoulders imparted to them all alike from the mould, the workman or dresser proceeds in the following manner. The types being screwed up in the stick, as before mentioned, with the jet-end outermost, and projecting beyond the wood about one-eighth of an inch, the stick is put into an open press, so as to present the jet-end uppermost, and then every thing is made fast by driving a long wedge, which bears upon a slip of wood, which lies close to the types the whole length: then a plough or plane is applied, which is so constructed as to embrace the projecting part of the types betwixt its long sides, which are made of polished iron. When the plane is thus applied, the steel cutter bearing upon that part between the shoulders of the types, where the inequalities lie, the dresser dexterously glides it along, and by this means strips off every irregular part that comes in the way, and so makes an uniform groove the whole length, and leaves the two shoulders standing; by which means every type become precisely like to another, as to the height against paper. The types being now finished, the stick is taken out of the press, and the whole column replaced upon the other stick: and after the whole are so dressed, he proceeds to pick out the bad letters, previous to putting them up into pages and papers. In doing this he takes the stick into his left hand, and turning the faces near to the light, he examines them carefully, and whenever an imperfect or damaged letter occurs, he nimbly plucks it out with a sharp bodkin, which he holds in the right hand for that purpose. Those letters which, from their form, project over the body of the type, and which

cannot on this account be rubbed on the stones, are scraped on the broad-sides with a knife or file, and some of the metal next the face pared away with a pen-knife, in order to allow the type to come close to any other. This operation is called *kerning*.

The excellence of printing types consists not only in the due performance of all the operations above described, but also in the hardness of the metal, form, and fine proportion of the character, and in the exact bearing and ranging of the letters in relation to one another.

FOUNT, or **FONT**, among printers, &c. a set or quantity of characters or letters of each kind, cast by a letter-founder, and sorted.—We say, a founder has cast a fount of pica, of english, of pearl, &c. meaning that he has cast a set of characters of these kinds.

A complete fount does not only include the running letters, but also large and small capitals, single letters, double letters, points, commas, lines, and numeral characters.

Founts are large or small, according to the demand of the printer who orders them by the hundred weight, or by sheets. When the printer orders a fount of 500, he means that the fount should weigh 500 lb. When he demands a fount of 10 sheets, it is understood, that with that fount he shall be able to compose 10 sheets, or 20 forms, without being obliged to distribute. The founder takes his measures accordingly; he reckons 120 pounds for a sheet, including the quadrates, &c. or 60 pounds for a form, which is half a sheet: not that the sheet always weighs 120 pounds, or the form 60 pounds; on the contrary, it varies according to the size of the form; besides, it is always supposed that there are letters left in the cases.

The letter-founders have a kind of list, or tariff, whereby they regulate their founts: the occasion thereof is, that some letters being in much more use, and oftener repeated than others, their cells or cases, should be better filled and stored than those of the letters which do not return so frequently. Thus the *o* and *i*, for instance, are always greater in quantity than the *k* or *z*.

This difference will be best perceived from a proportional comparison of those letters with themselves, or some others. Suppose a fount of 100,000 characters, which is a common fount; here the *a* should have 5000, the *c* 3000, the *e* 11,000, the *i* 6000, the *m* 3000, the *k* only 300, and the *x*, *y*, and *z*, not many more. But this is only to be understood of the letters of the lower case; those of the upper having other proportions, which it would be here too long to insist on.

FOUNTAIN, a spring or source of water rising out of the earth. Among the ancients, fountains were generally esteemed as sacred: but some were held to be so in a more particular manner. The good effects received from cold baths gave springs and rivers this high reputation; for the salutary influence was supposed to proceed from some presiding deity. Particular reasons might occasion some to be held in greater veneration than others. It was customary to throw little pieces of money into those springs, lakes, or rivers, which were esteemed sacred, to render the presiding divinities propitious; as the touch of a naked body

Fount,
Fountain.

Fountain. dy was supposed to pollute their hallowed waters. For the phenomena, theory, and origin, of fountains or springs. See SPRING.

Artificial FOUNTAIN, called also a *jet d'eau*, is a contrivance by which water is violently spouted upwards. See HYDRAULICS.

Boiling FOUNTAIN. See ICELAND.

FOUNTAIN-Tree, a very extraordinary vegetable growing in one of the Canary islands, and likewise said to exist in some other places, which distils water from its leaves in such plenty as to answer all the purposes of the inhabitants who live near it. Of this tree we have the following account in Glasse's history of the Canary islands.—“There are only three fountains of water in the whole island of Hierro, wherein the fountain-tree grows. One of these fountains is called *A-cof*, which, in the language of the ancient inhabitants, signifies *river*; a name, however, which does not seem to have been given it on account of its yielding much water, for in that respect it hardly deserves the name of a fountain. More to the northward is another called *Hapio*; and in the middle of the island is a spring, yielding a stream about the thickness of a man's finger. This last was discovered in the year 1565, and is called the *fountain of Anton. Hernandez*. On account of the scarcity of water, the sheep, goats, and swine, here do not drink in the summer, but are taught to dig up the roots of fern, and chew them to quench their thirst. The great cattle are watered at those fountains, and at a place where water distils from the leaves of a tree. Many writers have made mention of this famous tree, some in such a manner as to make it appear miraculous: others again deny the existence of any such tree; among whom is Father Feyjoo, a modern Spanish author, in his *Theatro Critico*. But he, and those who agree with him in this matter, are as much mistaken as those who would make it appear to be miraculous. This is the only island of all the Canaries which I have not been in; but I have sailed with natives of Hierro, who, when questioned about the existence of this tree, answered in the affirmative.

“The author of the *History of the discovery and conquest* has given us a particular account of it, which I shall here relate at large.

“The district in which this tree stands is called *Tigulabe*; near to which, and in the cliff or steep rocky ascent that surrounds the whole island, is a narrow gutter or gulley, which commences at the sea, and continues to the summit of the cliff, where it joins or coincides with a valley which is terminated by the steep front of a rock. On the top of this rock grows a tree, called in the language of the ancient inhabitants, *Garfe*, “Sacred or Holy Tree,” which for many years has been preserved sound, entire, and fresh. Its leaves constantly distil such a quantity of water as is sufficient to furnish drink to every living creature in Hierro; nature having provided this remedy for the drought of the island. It is situated about a league and a half from the sea. Nobody knows of what species it is, only that it is called *Til*. It is distinct from other trees, and stands by itself: the circumference of the trunk is about 12 spans, the diameter four, and in height from the ground to the top of the highest branch, 40 spans: the circumference of all the branches together is 120 feet. The branches are thick and extended;

the lowest commence about the height of an ell from the ground. Its fruit resembles the acorn, and tastes something like the kernel of a pine apple, but is softer and more aromatic. The leaves of this tree resemble those of the laurel, but are larger, wider, and more curved; they come forth in a perpetual succession, so that the tree always remains green. Near to it grows a thorn which fastens on many of its branches, and interweaves with them; and at a small distance from the garfe are some beech-trees, bresos, and thorns. On the north side of the trunk are two large tanks or cisterns, of rough stone, or rather one cistern divided, each half being 20 feet square and 16 spans in depth. One of these contains water for the drinking of the inhabitants; and the other that which they use for their cattle, washing, and such like purposes. Every morning, near this part of the island, a cloud or mist arises from the sea, which the south and easterly winds force against the fore-mentioned steep cliff; so that the cloud having no vent but by the gutter, gradually ascends it, and from thence advances slowly to the extremity of the valley, whence it is stopped and checked by the front of the rock which terminates the valley, and then rests upon the thick leaves and wide-spreading branches of the tree, from whence it distils in drops during the remainder of the day, until it is at length exhausted, in the same manner that we see water drip from the leaves of trees after a heavy shower of rain. This distillation is not peculiar to the garfe or til; for the bresos, which grow near it likewise drop water; but their leaves being few and narrow, the quantity is so trifling, that though the natives save some of it, yet they make little or no account of any but what distils from the til, which, together with the water of some fountains, and what is saved in the winter season, is sufficient to serve them and their flocks. This tree yields most water in those years when the Levant or easterly winds have prevailed for a continuance; for, by these winds only the clouds or mists are drawn hither from the sea. A person lives on the spot near which this tree grows, who is appointed by the council to take care of it and its water; and is allowed a house to live in, with a certain salary. He every day distributes to each family of the district seven pots or vessels full of water, besides what he gives to the principal people of the island.”

“Whether the tree which yields water at this present time be the same as that mentioned in the above description, I cannot pretend to determine; but it is probable there has been a succession of them; for Pliny, describing the Fortunate Island, says, ‘In the mountains of Ombrion are trees resembling the plant ferula, from which water may be procured by pressure. What comes from the black kind is bitter, but that which the white yields is sweet and potable.’”

Trees yielding water are not peculiar to the island of Hierro; for travellers inform us of one of the same kind on the island of St Thomas, in the bight or gulph of Guiney. In Cockburn's voyages we find the following account of a dropping tree, near the mountains of Fera Paz, in America.

“On the morning of the fourth day we came out on a large plain, where were great numbers of fine deer, and in the middle stood a tree of unusual size, spreading its branches over a vast compass of ground.

Ca-

Fountain,
Fourmont.

curiosity led us up to it. We had perceived, at some distance off, the ground about it to be wet; at which we began to be somewhat surprised, as well knowing there had no rain fallen for near six months past, according to the certain course of the season in that latitude: that it was impossible to be occasioned by the fall of dew on the tree, we were convinced, by the sun's having power to exhale away all moisture of that nature a few minutes after its rising. At last, to our great amazement as well as joy, we saw water dropping, or as it were distilling, fast from the end of every leaf of this wonderful (nor had it been amiss as I had said *miraculous*) tree; at least it was so with respect to us, who had been labouring four days through extreme heat, without receiving the least moisture, and were now almost expiring for the want of it.

"We could not help looking on this as liquor sent from heaven to comfort us under great extremity. We caught what we could of it in our hands, and drank very plentifully of it; and liked it so well, that we could hardly prevail with ourselves to give over. A matter of this nature could not but incite us to make the strictest observations concerning it; and accordingly we staid under the tree near three hours, and found we could not fathom its body in five times. We observed the soil where it grew to be very strong; and upon the nicest enquiry we could afterwards make, both of the natives of the country and the Spanish inhabitants, we could not learn there was any such tree known throughout New Spain, nor perhaps all America over: but I do not relate this as a prodigy in nature, because I am not philosopher enough to ascribe any natural cause for it; the learned may perhaps give substantial reasons in nature for what appeared to us a great and marvellous secret."

FOUQUIERES (James), an eminent painter, was born at Antwerp in 1580, and received his chief instructions from Velvet Brughel. He applied himself to the study of the landscapes, and went to Italy to improve himself in colouring; and succeeded so happily, that his works are said to be nearly equal to those of Titian.—He was engaged and much caressed at the court of the elector Palatine, and afterwards spent several years of his life in France; where his works met with universal approbation, and he was proportionably well paid for his paintings. Yet by some misconduct he sunk into poverty, and died in the house of an inconsiderable painter in 1659. He had resided for several years at Rome and Venice, where he acquired that excellent style of colouring and design for which he is so deservedly distinguished.

FOURCHEE, or **FOURCHY**, in heraldry, an appellation given to a cross forked at the ends. See **HERALDRY**.

FOURMONT (Stephen), professor of the Arabic and Chinese languages, and one of the most learned men of his time, was born at Herbelia, a village four leagues from Paris, in 1683. He studied in Mazarine college, and afterwards in the Seminary of Thirty-three. He was at length professor of Arabic in the Royal College, and was made a member of the Academy of Inscriptions. In 1738 he was chosen a member of the Royal Society in London, and of that of Berlin in 1741. He was often consulted by the duke of Orleans, first prince of the blood; who had a

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particular esteem for him, and made him one of his secretaries. He wrote a great number of books; the most considerable of those which have been printed are, 1. *The Roots of the Latin Tongue*, in verse. 2. *Critical Reflections on the Histories of ancient Nations*. 2 vols 4to. 3. *Meditationes Sinicae*, folio. 4. *A Chinese Grammar*, in Latin, folio. 5. Several Dissertations printed in the *Memoirs of the Academy of Inscriptions*, &c. He died at Paris in 1745.

He ought not to be confounded with *Michael Fourmont*, his youngest brother; who took orders, was professor of the Syriac language in the Royal College, and a member of the Academy of Inscriptions. He died in 1746.

FOURNESS, in Loynsdale, Lancashire is a track, between the Kent, Leven, and Dudden-Sands, which runs north parallel with the west sides of Cumberland and Westmoreland; and on the south runs out into the sea as a promontory. Here, as Mr Camden expresses it, "the sea, as if enraged at it, lashes it more furiously, and in high tides has even devoured the shore, and made three large bays; viz. Kentland, into which the river Ken empties itself; Levensand and Duddensand between which the land projects in such a manner that it has its name thence; Foreness and Foreland, signifying the same with us as *promontorium anterius* in Latin." Bishop Gibson, however, derives the name of *Fourness*, or *Furness*, from the numerous furnaces, that were there are anciently, the rents and services of which (called *bloomsmithy rents*) are still paid. This whole tract, except on the coast, rises in high hills and vast piles of rocks called *Forness-Fells*: among which the Britons found a secure retreat, trusting to these natural fortresses, though nothing was inaccessible to the victorious Saxons: for we find the Britons settled here 228 years after the arrival of the Saxons: because at that time Egfrid king of Northumberland gave St Cuthbert the land called *Garthmell*, and all the Britans in it, as is related in his life. In these mountainous parts are found quarries of a fine durable blue slate to cover buildings with, which are made use of in many other parts of the kingdom. Here are several cotton mills lately erected; and if fuel for fire were more plentiful, the trade of this country would much increase; but there being no coals nearer than Wigan or Whitehaven, and the coast-duties high, firing is rather scarce, the country people using only turf or peat, and that begins to be more scarce than formerly. In the mosses of Fourness much fir is found, but more oak: the trunks in general lie with their heads to the east, the high winds having been from the west. High Fourness has ever had great quantities of sheep, which browse upon the hollies left in great numbers for them; and produces charcoal for melting iron-ore, and oak-bark for tanners use, in great abundance. The forests abounded with deer and wild boars, and the *legh* or *scote*, or large stags, whose horns are frequently found under ground here. The low or plain part of Fourness which is so called to distinguish it from the woody or mountainous part produces all sorts of grain, but principally oats, whereof the bread eaten is in this country is generally made; and there are found here veins of a very rich iron-ore, which is not only melted and wrought here, but great quantities are exported to other parts to mix with poorer ores. The three sands

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Fournes
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Fowey.

abovementioned are very dangerous to travellers by the tides and the many quicksands. There is a guide on horseback appointed to Kent or Lancaster sand at 10 l. *per ann.* to Leven at 6 l. *per ann.* out of the public revenue; but to Dudden, which are most dangerous, none; and it is no uncommon thing for persons to pass over it in parties of 100 at a time like caravans, under the direction of the carriers, who go to or from every day. The sands are less dangerous than formerly, being more used and better known, and travellers never going without the carriers or guides. "Furnis abbey up in the mountains," was begun at Tulket in Amounderness 1124, by Stephen earl of Boulogne, afterwards king of England, for the monks of Savigni in France, and three years after removed to this valley, then called *Bekangessgill*, or the vale of nightshade." It was of the Cistercian order, endowed with above 800 l. *per ann.* Out of the monks of this abbey, Mr Camden informs us, the bishops of the Isle of Man, which lies over against it, used to be chosen by ancient custom; it being as it were the mother of many monasteries in Man and Ireland. Some ruins, and part of the fosse which surrounded the monastery, are still to be seen at Tulket. The remains at Fournes breathe that plain simplicity of the Cistercian abbeys; the chapter-house was the only piece of elegant gothic about it, and its roof has lately fallen in. Part of the painted glass from the east window, representing the crucifixion, &c. is preserved at Winder-mere church in Bowlness, Westmoreland. The church (except the north side of the nave), the chapter-house, refectory, &c. remain, only unroofed.

FOURTH REDUNDANT, in music. See INTERVAL.

FOWEY, or FOY, a town of Cornwall in England, 240 miles from London, with a commodious haven on the Channel. It is a populous place, extending above one mile on the east side of a river of its own name; and has a great share in the fishing trade, especially pilchards. It rose so much formerly by naval wars and piracies, that in the reign of Edward III. its ships refusing to strike when required as they sailed by Rye and Winchelsea, were attacked by the ships of those ports, but defeated them; whereupon they bore their arms mixed with the arms of those two cinque ports, which gave rise to the name of the "Gallants of Fowey." And we learn from Camden, that this town quartered a part of the arms of every one of the cinque-ports with their own; intimating, that they had at times triumphed over them all: and indeed once they were so powerful, that they took several of the French men of war. In the reign of Edward III. they rescued certain ships of Rye from distress, for which this town was made a member of the cinque-ports. Edward IV. favoured Fowey so much, that when the French threatened to come up the river to burn it, he caused two towers, the ruins of which are yet visible, to be built at the public charge for its security: but he was afterwards so disgusted with the inhabitants for attacking the French after a truce proclaimed with Louis XI. that he took away all their ships and naval stores, together with a chain drawn across the river between the two forts abovementioned, which was carried to Dartmouth. It is said they were so insolent, that they cut off the ears of the king's pursuivants: for which some lives were forfeited as well as estates. The corporation con-

sists of a mayor, recorder, 8 aldermen, a town-clerk, and 2 assistants. The market is Saturday, the fairs May-day and Sept. 10. Here are a fine old church, a free-school and an hospital. The toll of the market and fairs, and keyage of the harbour, were vested in the corporation on the payment of a fee-farm rent of about 40s. It does not appear to have sent members to parliament before the 13th of Queen Elizabeth. Here is a coinage for the tin; of which a great quantity is dug in the country to the north and west of it. The river Foy, or Foath, is very broad and deep here, and was formerly navigable as high as Lestwithiel. W. Long. 5°, N. Lat. 50. 27.

FOWL, among zoologists, denotes the larger sorts of birds, whether domestic or wild: such as geese, pheasants, partridges, turkey, ducks, &c.

Tame fowl make a necessary part of the stock of a country farm. See the article POULTRY.

Fowls are again distinguished into two kinds, *viz.* land and water fowl, these last being so called from their living much in and about water: also into those which are accounted *game*, and those which are not. See the article GAME.

FOWLING, the art of catching birds by means of bird-lime, decoys, and other devices, or the killing of them by the gun. See BIRD-Catching, BIRD-Lime, DECOY, SHOOTING, and the names of the different birds in the order of the alphabet.

FOWLING, is also used for the pursuing and taking birds with hawks, more properly called FALCONRY or HAWKING. See these articles.

FOWLING-Piece, a light gun for shooting birds. That piece is always reckoned best which has the longest barrel, from 5½ to 6 feet, with a moderate bore; though every fowler should have them of different sizes, suitable to the game he designs to kill. The barrel should be well polished and smooth within, and the bore of an equal bigness from one end to the other; which may be proved by putting in a piece of pasteboard, cut of the exact roundness of the top: for if this goes down without stops or slipping you may conclude the bore good. The bridge-pan must be somewhat above the touch-hole, and ought to have a notch to let down a little powder: this will prevent the piece from recoiling, which it would otherwise be apt to do. As to the locks, choose such as are well filed with true work, whose springs must be neither too strong nor too weak. The hammer ought to be well hardened and pliable to go down to the pan with a quick motion.

FOX, in zoology. See CANIS.

The fox is a great nuisance to the husbandman, by taking away and destroying his lambs, geese, poultry, &c. The common way to catch him is by gins; which being baited, and a train made by drawing raw flesh across in his usual paths or haunts to the gin, it proves an inducement to bring him to the place of destruction.

The fox is also a beast of chase, and is taken with grehounds, tarriers, &c. See the article HUNTING.

Fox (John), the martyrologist, was born at Boston in Lincolnshire in the year 1517. At the age of 16 he was entered a student of Brazen-nose college in Oxford; and in 1543 he proceeded master of arts, and was chosen fellow of Magdalen college. He discovered an early genius for poetry, and wrote several Latin comedies, the

Fowl
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Fox.

Fox.

the subjects taken from scripture, which his son assures us were written in an elegant style. Forsaking the muses, he now applied himself with uncommon assiduity to the study of divinity, particularly church-history; and, discovering a premature propensity to the doctrine of reformation, he was expelled the college as an heretic. His distress on this occasion was very great; but it was not long before he found an asylum in the house of Sir Thomas Lucy of Warwickshire, who employed him as a tutor to his children. Here he married the daughter of a citizen of Coventry. Sir Thomas's children being now grown up, after residing a short time with his wife's father, he came to London; where finding no immediate means of subsistence, he was reduced to the utmost degree of want; but was at length (as his son relates) miraculously relieved in the following manner: As he was one day sitting in St Paul's church, emaciated with hunger, a stranger accosted him familiarly, and, bidding him be of good cheer, put a sum of money into his hand; telling him at the same time, that in a few days new hopes were at hand. He was soon after taken into the family of the duchess of Richmond, as tutor to the earl of Surrey's children, who, when their father was sent to the tower, were committed to her care. In this family he lived, at Ryegate in Surrey, during the latter part of the reign of Henry VIII. The entire reign of Edward VI. and part of that of queen Mary; but at length, persecuted by his implacable enemy bishop Gardiner, he was obliged to seek refuge abroad. Basil in Switzerland was the place of his retreat, where he subsisted by correcting the press. On the death of queen Mary he returned to England; where he was graciously received by his former pupil the duke of Norfolk, who retained him in his family as long as he lived, and bequeathed him a pension at his death. Mr secretary Cecil also obtained for him the rectory of Shipton near Salisbury; and we are assured that he might have had considerable church preferment, had it not been for his unwillingness to subscribe to the canons. He died in the year 1587, in the 70th year of his age; and was buried in the chancel of St Giles's, Cripplegate. He was a man of great industry, and considerable learning; a zealous, but not a violent reformer; a nonconformist, but not an enemy to the church of England. He left two sons; one of which was bred a divine, the other a physician. He wrote many pieces: but his principal work is, the Acts and monuments of the Church, &c. commonly called *Fox's Book of Martyrs*. His facts are not always to be depended on, and he often loses his temper; which, considering the subject, is not much to be wondered at.

FOX (George), the founder of the sect of English Quakers, was a shoemaker in Nottingham. The accounts of those times tell us, that as he wrought at his trade, he used to meditate much on the scriptures: which, with his solitary course of life, improving his natural melancholy, he began at length to fancy himself inspired; and in consequence thereof set up for a preacher.

He proposed but few articles of faith; insisting chiefly on moral virtue, mutual charity, the love of God, and a deep attention to the inward motions and secret operations of the spirit: he required a plain simple worship, and a religion without ceremonies, making it

Fox.

a principal point to wait in profound silence the directions of the Holy Spirit. Fox met with much rough treatment for his zeal, was often imprisoned, and several times in danger of being knocked on the head. But all discouragements notwithstanding, his sect prevailed much, and many considerable men were drawn over to them; among whom were BARCLAY and PENN. He died in 1681. His followers were called *Quakers*, in derision of some unusual shakings and convulsions with which they were seized at their first meetings. See the article *QUAKERS*.

Fox-Glove, in botany. See *DIGITALIS*.

Fox-Islands, the name of a groupe of islands, 16 in number, situated between the eastern coast of Kamtschatka and the western coast of the continent of America. Each island has a particular name; but the general name *Fox-islands* is given to the whole group, on account of the great number of black, grey, and red foxes with which they abound. The dress of the inhabitants consists of a cap and a fur coat, which reaches down to the knee. Some of them wear common caps of a party-coloured bird-skin, upon which they leave part of the wings and tail. On the fore-part of their hunting and fishing caps, they place a small board like a screen, adorned with the jaw-bones of sea-bears, and ornamented with glass-beads, which they receive in barter from the Russians. At their festivals and dancing parties they use a much more showy sort of caps. They feed upon the flesh of all sorts of sea-animals, and generally eat it raw. But if at any time they choose to dress their victuals, they make use of a hollow stone; having placed the fish or flesh therein, they cover it with another, and close the interstices with lime or clay. They then lay it horizontally upon two stones, and light a fire under it. The provision intended for keeping is dried without salt in the open air. Their weapons consist of bows, arrows, and darts; and for defence they use wooden shields.—The most perfect equality reigns among these islanders. They have neither chiefs nor superiors, neither laws nor punishments. They live together in families, and societies of several families united, which form what they call a *race*, who, in case of an attack or defence, mutually help and support each other. The inhabitants of the same island always pretend to be of the same race; and every person looks upon his island as a possession, the property of which is common to all the individuals of the same society. Feasts are very common among them, and more particularly when the inhabitants of one island are visited by those of the others. The men of the village meet their guests bearing drums, and preceded by the women, who sing and dance. At the conclusion of the dance, the hosts serve up their best provisions, and invite their guests to partake of the feast. They feed their children when very young with the coarsest flesh, and for the most part raw. If an infant cries, the mother immediately carries it to the sea-side, and whether it be summer or winter, holds it naked in the water until it is quiet. This custom is so far from doing the children any harm, that it hardens them against the cold, and they accordingly go barefooted through the winter without the least inconvenience. They seldom heat their dwellings; but when they are desirous of warming themselves, they light a bundle of hay, and stand

Fracastor, over it; or else they set fire to train-oil, which they pour into a hollow stone. They have a good share of plain natural sense, but are rather slow of understanding. They seem cold and indifferent in most of their actions; but let an injury, or even a suspicion only, rouse them from this phlegmatic state, and they become inflexible and furious, taking the most violent revenge without any regard to the consequences. The least affliction prompts them to suicide; the apprehension of even an uncertain evil often leads them to despair; and they put an end to their days with great apparent insensibility.

FRACASTOR (Jerome), a most eminent Italian poet and physician, was born at Verona in the year 1482. Two singularities are related of him in his infancy: one is, that his lips adhered so closely to each other when he came into the world, that a chirurgion was obliged to divide them with his incision-knife; the other, that his mother was killed with lightning, while he, though in her arms at the very moment, escaped unhurt. Fracastor was of parts so exquisite, and made so wonderful a progress in every thing he undertook, that he became eminently skilled not only in the belles lettres, but in all arts and sciences. He was a poet, a philosopher, a physician, an astronomer, a mathematician, and what not? He was a man of vast consequence in his time; as appears from pope Paul III.'s making use of his authority to remove the council of Trent to Bolougne, under the pretext of a contagious distemper, which, as Fracastor deplored, made it no longer safe to continue at Trent. He was intimately acquainted with cardinal Bembo, Julius Scaliger, and all the great men of his time. He died of an apoplexy at Casti near Verona, in 1553: and in 1559, the town of Verona erected a statue in honour of him.

He was the author of many performances, both as a poet and as a physician; yet never man was more disinterested in both these capacities than he: evidently so as a physician, for he practised without fees; and as a poet, whose usual reward is glory, nothing could be more indifferent. It is owing to this indifference, that we have so little of his poetry, in comparison of what he wrote; and that, among other compositions, his Odes and Epigrams, which were read in manuscript with infinite admiration, yet, never passing the press, were lost. What we have now of his, are the three books of "Siphilis, or of the French disease;" a book of Miscellaneous Poems; and two books of his poem, intitled, *Joseph*, which he began at the latter end of his life, but did not live to finish. And these works, it is said, would have perished with the rest, if his friends had not taken care to preserve and communicate copies of them: For Fracastor, writing merely for amusement, never troubled himself in the least about what became of his works after they once got out of his hands. Fracastor composed also a poem, called *Alcon, sive de cura canum venaticorum*. His poems as well as his other works are written all in Latin. His medical pieces are, *De Sympathia & Antipathia*,—*De contagione & contagionis morbis*,—*De causis criticorum dierum*,—*De vini temperatura*, &c. His works have been printed separately and collectively. The best edition of them is that of Padua 1735, in 2 vols 4to.

FRACHES, in the glass trade, are the flat iron pans into which the glass vessels already formed are

put when in the tower over the working-furnace, and by means of which they are drawn out through the leers, that they may be taken gradually from the fire, and cool by degrees.

FRACTION, in arithmetic and algebra, a part or division of an unit or integer; or a number which stands to an unit in the relation of a part to its whole. The word literally imports a broken number.

Fractions are usually divided into decimal, sexagesimal, and vulgar. See ALGEBRA and ARITHMETIC.

FRACTURE, in surgery, a rupture of a bone or a solution of continuity in a bone when it is crushed or broken by some external cause. See SURGERY.

FRÆNUM, or **FRENUM**, *Bridle*, in anatomy, a name given to divers ligaments, from their office in retaining and curbing the motions of the parts they are fitted to.

FRÆNUM Lingue, or *Bridle of the Tongue*; a membranous ligament, which ties the tongue to the os hyoides, larynx, fauces, and lower parts of the mouth. In some subjects the *frænum* runs the whole length of the tongue to the very tip; in which cases, if it were not cut, it would take away all possibility of speech. See TONGUE-Tied.

FRÆNUM Penis, a slender ligament, whereby the prepuce is tied to the lower part of the glans of the penis. Nature varies in the make of this part; it being so short in some, that unless divided it would not admit of perfect erection. There is also a kind of little *frænum*, fastened to the lower part of the clitoris.

FRAGA, a strong town with a handsome castle in the kingdom of Arragon in Spain. It is strong by situation among the mountains; having the river Cinca before it, whose high banks are difficult of access; and at its back a hill, which cannot easily be approached with large cannon. Alphonso VII. king of Arragon, and the first of that name of Castile, was killed by the Moors in 1134, when he besieged this town. E. Long. O. 23. N. Lat. 41. 28.

FRAGARIA, the **STRAWBERRY**: A genus of the polygynia order, belonging to the icosaandria class of plants; and in the natural method ranking under the 35th order, *Senticosæ*. The calyx is decemfid; the petals five; the receptacle of the seeds ovate, in the form of a berry, and deciduous. There is but one species, viz. the vesca, or cultivated strawberry. The principal varieties are, 1. The sylvestris, or wood-strawberry, with oval sawed leaves, and small round fruit. 2. The Virginian scarlet, or Virginia strawberry, with oblong oval sawed leaves, and a roundish scarlet-coloured fruit. 3. The Moschata, or hautboy, or musky strawberry, having oval, lanceolate, rough leaves, and large pale-red fruit. 4. The Chilensis, or Chili strawberry, with large, oval, thick, hairy leaves, large flowers, and very large firm fruit. 5. The Alpina, Alpine, or monthly strawberry, having small oval leaves, small flowers, and moderate-sized, oblong, pointed fruit.

All these varieties are hardy, low, perennials, durable in root, but the leaves and fruit-stalks are renewed annually in spring. They flower in May and June, and their fruit comes to perfection in June, July, and August; the Alpine kind continuing till the beginning of winter. They all prosper in any common garden soil, producing abundant crops annually without

Fraction
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Fragaria.

Fraguier.
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Frame.

out much trouble. They increase exceedingly every summer, both by off-sets or suckers from the sides of the plants, and by the runners or strings, all of which rooting and forming plants at every joint, each of which separately planted bears a few fruit the following year, and bear in great perfection the second summer. Those of the Alpine kind will even bear fruit the same year that they are formed. All the sorts are commonly cultivated in kitchen-gardens, in beds or borders of common earth, in rows lengthwise 15 or 18 inches distance; the plants the same distance from one another in each row. Patches of the different sorts disposed here and there in the fronts of the different compartments of the pleasure-ground, will appear ornamental both in their flowers and fruit, and make an agreeable variety.

Strawberries eaten either alone, or with sugar and milk, are universally esteemed a most delicious fruit. They are grateful, cooling, subacid, and juicy. Tho' taken in large quantities, they seldom disagree. They promote perspiration, impart a violet smell to the urine, and dissolve the tartareous incrustations on the teeth. People afflicted with the gout or stone have found relief by using them very largely; and Hoffman says, he has known consumptive people cured by them. The bark of the root is astringent.—Sheep and goats eat the plant; cows are not fond of it; horses and swine refuse it.

FRAGUIER (Glaude Francis), a polite and learned French writer, born at Paris, of a noble family, in 1666. He was educated under the Jesuits, and was even admitted into the order, though he afterwards quitted it; and being thus at liberty to follow his inclinations, he soon after assisted the Abbé Bignon in conducting the *Journal de Sçavans*, having all the qualifications for such a work. His works consist of Latin poems, and a great number of very excellent dissertations. He died in 1728.

FRAIL, a basket made of rushes or the like, in which are packed up figs, raisins, &c. It signifies also a certain quantity of raisins, about 75 pounds.

FRAISE, in fortification, a kind of defence, consisting of pointed stakes, six or seven feet long, driven parallel to the horizon in the retrenchments of a camp, a half moon, or the like, to prevent any approach or scalade.

Fraises differ from palisades chiefly in this, that the latter stand perpendicular to the horizon, and the former jet out parallel to the horizon, or nearly so, being usually made a little sloping, or with the points hanging down. Fraises are chiefly used in retrenchments and other works thrown up of earth; sometimes they are found under the parapet of a rampart, serving instead of the cordon of stone used in stone-works.

To FRAISE a Battalion, is to line the musqueteers round with pikes, that in case they should be charged with a body of horse, the pikes being presented, may cover the musqueteers from the shock, and serve as a barricade.

FRAME, in joinery, a kind of case, wherein a thing is set or inclosed, or even supported; as a window-frame, a picture frame, &c.

FRAME is also a machine used in divers arts; as,

FRAME, among printers, is the stand which supports the cases. See CASE.

FRAME, among founders, a kind of ledge inclosing a board; which, being filled with wetted sand, serves as a mould to cast their works in. See FOUNDERY.

FRAME is more particularly used for a sort of loom, whereon artificers stretch their linens, silks, stuffs, &c. to be embroidered, quilted, or the like.

FRAME, among painters, a kind of square, consisting of four long slips of wood joined together, whose intermediate space is divided by threads into several little squares like a net; and hence sometimes called *reticula*. It serves to reduce figures from great to small; or on the contrary, to augment their size from small to great.

FRAMLINGHAM, a town of Suffex, 88 miles from London. It is a large old place, with a castle, supposed to have been built by some of the first kings of the East-Angles; the walls yet standing, are 44 feet high, 8 thick, with thirteen towers 14 feet above them, 2 of which are watch-towers. To this castle the princess, afterwards queen Mary I. retired, when the Lady Jane Grey was her competitor for the crown.

The town is pleasantly situated, though but indifferently built, upon a clay hill, in a fruitful soil and a healthy air, near the source of the river Ore, by some called Wincknel, which runs through it to Orford. It has a spacious place for the market on Saturday; and a large stately church built all of black flint, with a steeple 100 feet high; two good alms-houses; and a free-school.

FRANC. See FRANK.

FRANCE, a large kingdom of Europe, situated between 5° W. and 7° E. Long. and between 43° and 51° N. Lat. being bounded by the English channel and the Austrian Netherlands on the north; by Germany, Switzerland, Savoy, and Piedmont, in Italy, on the east; by the Mediterranean sea, and the Pyrenean mountains, which separate it from Spain, on the south; and by the bay of Biscay on the west.

The kingdom of France was originally possessed by the *Celtes* or *Gauls*. They were a very warlike people, and often checked the progress of the Roman arms: nor did they yield till the time of Julius Cæsar, who totally subdued their country, and reduced it to the form of a Roman province*.

The Romans continued in quiet possession of Gaul, as long as their empire retained its strength, and they were in a condition to repress the incursions of the German nations, whom even in the zenith of their power they had not been able to subdue. But in the reign of the emperor Valerian, the ancient Roman valour and discipline had begun to decline, and the same care was not taken to defend the provinces as formerly. The barbarous nations, therefore, began to make much more frequent incursions; and among the rest the *Franks*, a German nation inhabiting the banks of the Rhine, proved particularly troublesome. Their origin is variously accounted for; but the most probable supposition is, that about the time of the emperor Gordian, the people inhabiting the banks of the Lower Rhine entered into a confederacy with those who dwelt on the Weser, and both together assumed the name of *Franks* or *Freemen*. Their first irruption, we are told by Valerian, happened in the year 254, the second of Valerian's reign. At this time they were but few in number; and were repulsed by Aurelian, afterwards emperor.

Not

Frame
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France.

First subdued by Julius Cæsar.

* See Gaul.

Invaded by the Franks.

France. Not discouraged by this check, they returned two years after in far greater numbers; but were again defeated by Gallienus, whom Valerian had chosen for his partner in the empire. Others, however, continued to pour in from their native country in such multitudes, that Gallienus, no longer able to drive them out by force of arms, made advantageous proposals to one of their chiefs, whom he engaged to defend the frontiers against his countrymen as well as other invaders.

This expedient did not long answer the purpose. In 260 the Franks, taking advantage of the defeat and captivity of Valerian in Persia, broke into Gaul, and afterwards into Italy, committing every where dreadful ravages. Five years afterward they invaded Spain; which they possessed, or rather plundered, for the space of 12 years; nor could they be driven out of Gaul till the year 275, when the emperor Probus not only gave them a total overthrow in that country, but pursued them into their own, where he built several forts to keep them in awe. This intimidated them so much, that nine of their kings submitted to the emperor, and promised an annual tribute.—They continued quiet till the year 287; when in conjunction with the Saxon pirates they plundered the coasts of Gaul, carrying off an immense booty. To revenge this insult, the emperor Maximian entered the country of the Franks the following year, where he committed such ravages that two of their kings submitted to him; and to many of the common people who choose to remain in Gaul, he allowed lands in the neighbourhood of Treves and Cambray.

The restless disposition of the Franks, however, did not allow them to remain long in quiet. About the year 293, they made themselves master of Batavia and part of Flanders; but were entirely defeated, and forced to surrender at discretion, by Constantius the father of Constantine the Great, who transplanted them into Gaul. Their countrymen in Germany continued quiet till the year 306, when they renewed their depredations; but being overcome by Constantine the Great, two of their kings were taken prisoners, and thrown to the wild beasts in the shows exhibited on that occasion.

All these victories, however, as well as many others said to have been gained by the Romans, were not sufficient to prevent the incursions of this restless and turbulent nation; insomuch that in the year 335, they had made themselves masters of 40 cities in the province of Gaul. Soon after, they were totally defeated by the emperor Julian, and again by count Theodosius, father to the emperor of that name; but, in the year 388, they ravaged the province with more fury than ever, and cut off a whole Roman army that was sent against them. As the western empire was at this time in a very low state, they for some time found more interruption from other barbarians than from the Romans, till their progress was checked by Aetius.

³
Pharamond
the first
king.

When the war with Aetius broke out, the Franks were governed by one *Pharamond*, the first of their kings of whom we have any distinct account. He is supposed to have reigned from the year 417 or 418, to 428; and is thought by archbishop Usher to have been killed in the war with Aetius. By some he is

supposed to have compiled the Salic Laws, with the assistance of four sages named *Wifegast*, *Lofegast*, *Widegast*, and *Solegast*. But Valesius is of opinion that the Franks had no written laws till the time of Clovis.

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Pharamond was succeeded by his son Clodio, who likewise carried on a war against the Romans. He is said to have received a terrible overthrow from Aetius near the city of Lens; notwithstanding which, he advanced to Cambray, and made himself master of that city, where for some time he took up his residence. After this he extended his conquests as far as the river Somme, and destroyed the cities of Treves and Cologne, Tournay and Amiens. He died in the year 448, and was succeeded by Merovæus.

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Authors are not agreed whether the new king was brother, or son, or any relation at all, to Clodio. It seems probable indeed, that he was of a different family; as from him the first race of French kings were styled *Merovingian*. He was honoured and respected by his people, but did not greatly enlarge the boundaries of his kingdom. He died in 458.

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Merovæus was succeeded by his son Childeric, who being no longer kept in awe by Aetius, made war on the Romans, and extended his conquests as far as the river Loire. He is said to have taken the city of Paris after a siege of five years, according to some, and of ten, according to others. The Roman power was now totally destroyed in Italy; and therefore *Clodovæus*, *Clovis*, or *Louis*, for his name is differently written, who succeeded Childeric, set himself about making an entire conquest of Gaul. Part of the province was still retained by a Roman named *Syagrius*, who probably had become sovereign of the country on the downfall of the western empire in 476. He was defeated and taken prisoner by Clovis, who afterwards caused him to be beheaded, and soon after totally reduced his dominions.

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Thus was the French monarchy established by Clovis in the year 487. He now possessed all the country lying between the Rhine and the Loire; which, though a very extensive dominion, was yet considerably inferior to what it is at present.

Clovis had been educated in the Pagan religion, and continued in that profession till the 30th year of his age; notwithstanding which he allowed his subjects full liberty of conscience. Having married, however, Clotilda, daughter of the duke of Burgundy, this princess, who was a zealous Christian, used all her influence with her husband to persuade him to embrace her religion. For some time he continued to waver; but happening to gain a battle, where, being in great danger, he had invoked the god of Clotilda and the Christians, he afterwards gave such a favourable ear to the discourses of Remigius bishop of Rheims that he soon declared himself a convert, and was baptised in the year 496. His acknowledgment of the truths of the gospel was not followed by any amendment of life: on the contrary, he employed the remainder of his life in the aggrandisement of himself and extension of his dominions by the most abominable treachery, fraud, and violence. In his attacks on Armorica he proved unsuccessful. The inhabitants of this country, which comprehended the maritime part of ancient Gaul lying between the Rivers Seine and Loire, had united for their defence; and though abandoned by the Romans,

France.

Clodio.

Merovæus.

Childeric.

French monarchy established by Clovis.

France.

mans, made a powerful defence against the barbarians who assaulted them on all sides. Clovis, finding them too powerful to be subdued by force, proposed an union with his people, which they readily accepted, and this the more easily on account of his professing the Christian religion. Thus the Christianity of Clovis in several instances proved subservient to the purposes of his ambition, and his power became gradually very formidable. The Burgundians at this time possessed all the country from the forest of Vosges to the sea of Marseilles, under Gondebaud the uncle of Clotilda; who to secure his own authority, had put to death two of his brothers, one of whom was the father of the French queen. The third brother, *Godagesil*, whom he had spared and allowed to possess the principality of Geneva, conspired with Clovis to drive him from his dominions. A war having commenced between the French and Burgundian monarchs, the latter was defeated in a battle by *Godagesil*, and obliged to fly to Avignon, leaving his antagonist master of the cities of Lyons and Vienne. The victor next laid siege to Avignon; but it was defended with such vigour, that Clovis at last thought proper to accept of a sum of money and an annual tribute from Gondebaud; who was likewise obliged to cede to *Godagesil* the city of Vienne, and several other places taken during the war.

Gondebaud no sooner found himself at liberty from his enemies, than he assembled a powerful army; with which he advanced towards Vienne, where *Godagesil* himself resided at that time. The place was garrisoned by 5000 Franks, and might have made considerable resistance; but Gondebaud being admitted through the subterraneous passage of an aqueduct, massacred most of the Franks, sent the rest prisoners to the king of the Visigoths, and put *Godagesil* to death. This was quickly followed by the submission of all the other places which had owned the authority of *Godagesil*: and Gondebaud, now thinking himself able to resist the power of Clovis, sent a message to inform him, that he must no longer expect the promised tribute; and though Clovis was very much mortified with this defection, he found himself obliged for the present to put up with the injury, and accept of the alliance and military service of the king of Burgundy.

His next expedition was against the Visigoths, who possessed considerable territories on both sides of the Pyrenean mountains. His motives for this undertaking were expressed in the following speech to his nobility when assembled in the city of Paris, which he considered as the capital of his dominions. "It is with concern (said the religious monarch) that I suffer the Arians to possess the most fertile part of Gaul; let us, with the aid of God, march against them; and having conquered them, annex their kingdom to our dominions." The nobility approved of the scheme; and Clovis marched against a prince for whom he had but lately professed the greatest regard, vowing to erect a church in honour of the holy apostles, if he succeeded in his enterprise. Alaric the king of the Visigoths was a young man destitute of military experience, though personally brave. He did not therefore hesitate at engaging his antagonist; but, unable to contend with the veteran troops of Clovis, his army was utterly defeated on the banks of the Clain, 10

miles south of Poitiers, in the year 507. Alaric, perceiving the ruin of his troops, rushed against Clovis in person, by whom he was killed, and the remainder of the army pursued for some time with great slaughter. After this victory the province of Aquitaine submitted, and Clovis established his winter quarters at Bourdeaux. Tholouse surrendered next spring; and the royal treasures of the Visigoths were transported to Paris. Angouleme was next reduced, and the city of Arles invested. But here the victorious career of Clovis was stopped by Theodoric king of the Ostrogoths, who had overturned the dominion of Odoacer in Italy. He had married Abolfleda the sister of Clovis, but had also given his own daughter in marriage to the king of the Visigoths, and had endeavoured, as much as was in his power, to preserve a good understanding between the two sovereigns. Finding this impossible, however, and that no bounds could be set to the ambition of Clovis, he sent one of his generals with a powerful army against him; by whom the French monarch was defeated with the loss of 30,000 men. By this misfortune Clovis was obliged to raise the siege of Arles with precipitation: however the Franks still retained the greatest part of their conquests, and the province of Aquitaine was indissolubly annexed to their empire.

In 509, Clovis had the title of Roman consul; by which means the people of Rome were insensibly led to pay a peculiar regard to the French monarchs: and Clovis was now supposed to be invested with a just title to all his conquests in whatever manner they had been acquired. He was solemnly invested with his new dignity in the church of St Martin in the city of Tours; after which he entered the cathedral clothed in a purple tunic and mantle, the badges of his office.

Clovis now proceeded to augment his power by the murder of his kinsmen the princes of the Merovingian race. Among those who perished on this occasion were Sigibert king of Cologne, with his son Cloderic, Cararic, another prince whose dominions have not been accurately pointed out by historians; Ranacaire, who governed the present diocese of Cambray; and Renomer king of the territory of Maine. All these Murders, however, were expiated, according to the views of the clergy of those times, by the great zeal he expressed in the cause of Christianity, and his liberality to the church.

Clovis died in the year 511, after having reformed and published the Salic laws: a few lines of which, debarring women from inheriting any part of the Salic lands, have been extended so far as to deprive the females of the royal family of France of their right of succession to the throne of that kingdom.

Clovis was buried in the church of St Peter and St Paul, now Genevieve, in the city of Paris, where his tomb is still to be seen. His dominions were divided among his four sons. Thieri, or Theodoric, the eldest, had the eastern part of the empire; and, from his making the city of Metz his capital, is commonly called the *king of Metz*. Clodomir, the eldest son by Clotilda, had the kingdom of Orleans; Childebert, and Clotaire, who were both infants, had the kingdoms of Paris and Soissons, under the tutelage of their mother. The prudence of Clotilda kept matters quiet in all the parts of the empire for eight years; but about

France.

8

Is honoured with the title of *Roman Consul*.

9

His dominions divided among his children.

France. about the year 520, a numerous fleet of Danes arrived at the mouth of the Meuse; and their king Cochiliac, having landed his forces, began to destroy the country with fire and sword. Against him Thieri sent his son Theodobert, who defeated the Danish army and navy, and killed their king, forcing the rest to retire with precipitation.

In 522, Hermanfroi king of Thuringia, having destroyed one of his brethren named *Berthaire*, and seized on his dominions, applied to Thieri for assistance against his other brother Balderic, whom he intended to treat in the same manner. In this infamous enterprise Thieri embarked, on condition that he should have one half of Balderic's dominions; but after the unhappy prince was overcome and killed in battle, Hermanfroi seized all his dominions. Thieri had no opportunity of revenging himself till the year 531; when perceiving the power of the Ostrogoths, whom he much dreaded, to considerably lessened by the death of king Theodric, he engaged his brother Clotaire to assist him: and they accordingly entered Thuringia with two powerful armies. They joined their forces as soon as they had passed the Rhine, and were quickly after reinforced by a considerable body of troops under the command of Theodobert. The allies attacked the army of Hermanfroi, which was advantageously posted; and having totally defeated it, he was forced to fly from place to place in disguise. Soon after this the capital was taken, and Hermanfroi himself being invited to a conference by Thieri, was treacherously murdered; after which his extensive dominions became feudatory to Thieri.

In the mean time, Clotilda had excited her children to make war on the Burgundians, in order to revenge the death of her father Chilperic, whom Gondeband king of Burgundy had caused to be murdered. Gondeband was now dead, and had left his dominions to his sons Sigismund and Godemar. Sigismund's forces were quickly defeated; and he himself was soon after delivered up his own subjects to Clodomir, who caused him to be thrown into a pit, where he perished miserably. By his death Godemar became sole master of Burgundy. Clodomir marched against him, and defeated him; but pursuing his victory too eagerly, was surrounded by his enemies and slain. After the reduction of Thuringia however, Childebert and Clotaire entered the kingdom of Burgundy at the head of a powerful army, and in 534 completed the conquest of it; in which, according to some, Godemar was killed; according to others, he retired into Spain, and from thence into Africa.

10
Clotaire
becomes
sole mo-
arch.

In 560 Clotaire became sole monarch of France. He had murdered the sons of Clodomir, who was killed in Burgundy as above related. Thieri and his children were dead, as was also Childebert; so that Clotaire was sole heir to all the dominions of Clovis. He had five sons; and the eldest of them, named *Chramnes*, had some time before rebelled against his father in Auvergne. As long as Childebert lived, he supported the young prince; but on his death, Chramnes was obliged to implore his father's clemency. He was at this time pardoned; but he soon began to cabal afresh, and engaged the count of Bretagne to assist him in another rebellion. The Bretons, however, were defeated, and Chramnes determined to make his escape; but percei-

ving that his wife and children were surrounded by his father's troops, he attempted to rescue them. In this attempt he was taken prisoner, and with his family was thrust into a thatched cottage near the field of battle; of which the king was no sooner informed, than he commanded the cottage to be set on fire, and all that were in it perished in the flames.

Clotaire did not long survive this cruel execution of his son, but died in 562; and after his death the French empire was divided among his four remaining sons, Caribert, Gontran, Sigebert, and Chilperic.—The old king made no division of his dominions before he died, which perhaps caused the young princes to fall out sooner than they would otherwise have done. After his death, however, they divided the kingdom by lot; when Caribert, the eldest, had the kingdom of Paris; Gontran, the second, had Orleans; Sigebert had Metz (or the kingdom of Austrasia); and Chilperic had Soissons. Provence and Aquitaine were possessed by all of them in common. The peace of the empire was disturbed in 563 by an invasion of the Abares; a barbarous nation, said to be the remains of the Huns. They entered Thuringia, which belonged to the dominions of Sigebert; but by him they were totally defeated, and obliged to repass the Elbe with precipitation. Sigebert pursued them close, but readily concluded a peace with them on their first proposals. To this he was induced, by hearing that his brother Chilperic had invaded his dominions, and taken Rheims and some other places in the neighbourhood. Against him, therefore, Sigebert marched with his victorious army, made himself master of Soissons his capital, and of the person of his eldest son Theodobert. He then defeated Chilperic in battle; and not only recovered the place which he had seized, but conquered the greater part of his dominions; nevertheless, on the mediation of the other two brothers, Sigebert abandoned all his conquests, set Theodobert at liberty, and thus restored peace to the empire.

Soon after this, Sigebert married Brunehaut daughter to Athanagilde king of the Visigoths in Spain; and in a little time after the marriage, died Caribert king of Paris, whose dominions were divided among his three brethren. In 567 Chilperic married Galswintha, Brunehaut's eldest sister, whom he did not obtain without some difficulty. Before her arrival, he dismissed his mistress called *Fredegonde*; a woman of great abilities and firmness of mind, but ambitious to the highest degree, and capable of committing the blackest crimes in order to gratify her ambition. The queen, who brought with her immense treasures from Spain, and made it her whole study to please the king, was for some time entirely acceptable. By degrees, however, Chilperic suffered Fredegonde to appear again at court, and was suspected of having renewed his intercourse with her; which gave such umbrage to the queen, that she desired leave to return to her own country, promising to leave behind her all the wealth she had brought. The king, knowing that this would render him extremely odious, found means to dissipate his wife's suspicions, and soon after caused her to be privately strangled, upon which he publicly married Fredegonde.

Such an atrocious action could not fail of exciting the greatest indignation against Chilperic. His domi-

France.

11

The em-
pire again
divided.

12

Infamous
conduct of
Chilperic

¹³ France. nions were immediately invaded by Sigebert and Gontran, who conquered the greatest part of them; after which they suddenly made peace, Chilperic consenting that Brunehaut should enjoy those places which on his marriage he had bestowed upon Galswintha, viz. Bourdeaux, Limoges, Cahors, Bigorre, and the town of Bearn, now called *Lescar*.

The French princes, however, did not long continue at peace among themselves. A war quickly ensued, in which Gontran and Chilperic allied themselves against Sigebert. The latter prevailed; and having forced Gontran to a separate peace, seemed determined to make Chilperic pay dear for his repeated perfidy and infamous conduct; when he was assassinated by a contrivance of Fredegonde, who thus saved herself and Chilperic from the most imminent danger. Immediately on his death, Brunehaut fell into the hands of Chilperic; but Gondebaud, one of Sigebert's best general's, made his escape into Austrasia with Childebert, the only son of Sigebert, an infant of about five years of age, who was immediately proclaimed king in room of his father. In a short time, however, Meroveus, eldest son to Chilperic, fell in love with Brunehaut, and married her without acquainting his father. Chilperic, on this news, immediately went to Rouen, where Meroveus and his consort were; and having seized them, sent Brunehaut and her two daughters to Metz, and carried Meroveus to Soissons. Soon after, one of his generals being defeated by Gontran, who espoused Brunehaut's cause, Chilperic, in a fit of rage, caused Meroveus to be shaved and confined in a monastery. From hence he found means to make his escape, and with great difficulty arrived in Austrasia, where Brunehaut would gladly have protected him: but the jealousy of the nobles was so strong, that he was forced to leave that country; and being betrayed into the hands of his father's forces, was murdered at the instigation of Fredegonde, as was generally believed.

The French empire was at this time divided between Gontran king of Orleans, called also king of Burgundy, Chilperic king of Soissons, and Childebert king of Austrasia. Chilperic found his affairs in a very disagreeable situation. In 579, he had a dispute with Varoc count of Bretagne, who refused to do him homage. Chilperic dispatched a body of troops against him; who were defeated, and he was then forced to submit to a dishonourable peace. His brother and nephew lived in strict union, and had no reason to be very well pleased with him. His own subjects, being oppressed with heavy taxes, were miserably poor and discontented. His son Clovis, by a former queen named *Andovera*, hated Fredegonde, and made no secret of his aversion. To add to this embarrassment, the seasons were for a long time so unfavourable, that the country was threatened with famine and pestilence at the same time. The king and queen were both attacked by an epidemic disease which then raged. They recovered: but their three sons, Clodobert, Samson, and Dagobert; died; after which, the sight of Clovis became so disagreeable to Fredegonde, that she caused him to be murdered, and likewise his mother Andovera, lest Chilperic's affection for her should return after the tragical death of her son.

¹⁴ And likewise Chilperic. In 583 Chilperic himself was murdered by some unknown assassins, when his dominions were on the point

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of being conquered by Gontran and Childebert, who had entered into a league for that purpose. After his death Fredegonde implored the protection of Gontran for herself and her infant son Clotaire; which he very readily granted, and obliged Childebert to put an end to the war. He found himself, however, greatly diffculted to keep Fredegonde and Brunehaut in awe; for these two princesses having been long rivals and implacable enemies, were continually plotting the destruction of each other. This, however, he accomplished, by favouring sometimes Brunehaut and sometimes Fredegonde; so that, during his life, neither of them durst undertake any thing against the other.

¹⁵ On the 28th of March 593, died Gontran, having lived upwards of 60, and reigned 32 years. Childebert succeeded to the kingdom without opposition, but did not long enjoy it; he himself died in the year 596, and his queen shortly after. His dominions were divided between his two sons Theodobert and Thierri; the first of whom was declared king of Austrasia, and the later king of Burgundy. As Theodobert was only in the 11th year of his age, and Thierri in his 10th, Brunehaut governed both kingdoms with an absolute sway. Fredegonde, however, took care not to let slip such a favourable opportunity as was offered her by the death of Childebert, and therefore made herself mistress of Paris and some other places on the Seine. Upon this Brunehaut sent against her the best part of the forces in Austrasia, who were totally defeated; but Fredegonde died before she had time to improve her victory, leaving her son Clotaire heir to all her dominions.

For some time Brunehaut preserved her kingdom in peace; but in the end her own ambition proved her ruin. Instead of instructing Theodobert in what was necessary for a prince to know, she took care rather to keep him in ignorance, and even suffered him to marry a young and handsome slave of his father's. The new queen was possessed of a great deal of affability and good-nature; by which means she in a short time gained the affection of her husband so much, that he readily consented to the banishment of Brunehaut. Upon this disgrace she fled to Thierri king of Burgundy, in the year 599. By him she was very kindly received; and instead of exciting jealousies or misunderstandings between the two brothers, she engaged Thierri to attempt the recovery of Paris, and the other places which had been wrested from their family by Fredegonde, procuring at the same time a considerable body of auxiliaries from the Visigoths. This measure was so acceptable to Theodobert, that he likewise raised a numerous army, and invaded Clotaire's dominions in conjunction with his brother. A battle ensued, in which the forces of Clotaire were totally defeated, and himself soon after obliged to sue for peace; which was not granted, but on condition of his yielding up the best part of his dominions.

This treaty was concluded in the year 600; but three years afterwards, it was broken by Clotaire. He was again attacked by the two brothers, and the war carried on with great vigour till the next spring. At this time Thierri having forced Landri, Clotaire's general, to a battle, gave him a total overthrow, in which the king's infant son Meroveus, whom he had sent along with Landri, was massacred; to gratify, as Clotaire

3 D

taire

France.

taire pretended, the malice of Brunehaut. After this victory, Thierry marched directly to Paris; fully bent on the destruction of his cousin, which now seemed inevitable. This, however, was prevented by Theodobert; who no sooner heard of the victory gained by Thierry, than he became jealous of his success, and offered Clotaire such terms of peace as he gladly accepted. The latter having then nothing to fear on the side of Austrasia, quickly compelled Thierry to listen to terms of accommodation also.

This behaviour of Theodobert greatly provoked his brother; and his resentment was highly inflamed by Brunehaut, who never forgot her disgrace in being banished from his court. A war was therefore commenced between the two brothers in 605; but it was so highly disapproved of by the nobility, that Thierry found himself obliged to put an end to it. The tranquillity which now took place was again disturbed in 607, by Theodobert's sending an embassy to demand some part of Childebert's dominions which had been added, by the will of that monarch, to those of Burgundy. The nobility of both kingdoms were so much averse to war, that they constrained their kings to consent to a conference, attended by an equal number of troops; but Theodobert, by a scandalous breach of his faith, brought double the number, and compelled his brother to submit to what terms he pleased. This piece of treachery instantly brought on a war; for Thierry was bent on revenge, and his nobility no longer opposed him. It was necessary, however, to secure Clotaire by a negociation; and accordingly a promise was made of restoring those parts of his dominions which had formerly been taken from him, provided he would remain quiet. This treaty being finished, Thierry entered Theodobert's dominions, defeated him in two battles, took him prisoner, used him with the utmost indignity; and having caused an infant son of his to be put to death, sent him to his grandmother Brunehaut. By her orders he was first shaved and confined in a monastery; but afterwards, fearing lest he should make his escape, she caused him to be put to death.—Clotaire, in the mean time, thought that the best method of making Thierry keep his word was to seize on those places which he had promised to restore to him, before his return from the war with Theodobert. This he accordingly did; and Thierry no sooner heard of his having done so, than he sent him a message requiring him to withdraw his forces, and, in case of his refusal, declared war. Clotaire was prepared for this; and accordingly assembled all the forces in his dominions, in order to give him a proper reception. But before Thierry could reach his enemies, he was seized with a dysentery; of which he died in the year 612, having lived 26 years, and reigned 17.

18
Death of
Thierry.

On the death of Thierry, Brunehaut immediately caused his eldest son, named *Sigibert*, then in the 10th year of his age, to be proclaimed king. It is probable, that she intended to have governed in his name with an absolute sway; but Clotaire did not give her time to discover her intentions. Having great intelligence in Austrasia and Burgundy, and knowing that the nobility in both kingdoms were disaffected to Brunehaut, he declared war against her; and she being betrayed by her generals, fell into the hands of her enemies. Clotaire gave her up to the nobles; who generally

hated her, and who used her in the most cruel manner. After having led her about the camp, exposed to the insults of all who had the meanness to insult her, she was tied by the leg and arm to the tail of an untamed horse, which, setting off at full speed, quickly dashed out her brains. After this her mangled body was reduced to ashes, which were afterwards interred in the abbey of St Martin at Autun.

France.

19
Brunehaut
put to a
cruel death.

Thus in the year 613, Clotaire became sole monarch of France; and quietly enjoyed his kingdom till his death, which happened in 628. He was succeeded by Dagobert; who proved a great and powerful prince, and raised the kingdom of France to a high degree of splendor. Dagobert was succeeded by his sons Sigebert and Clovis; the former of whom had the kingdom of Austrasia, and the latter that of Burgundy. Both the kings were minors at the time of their accession to the throne, which gave an opportunity to the mayors of the palace (the highest officers under the crown) to usurp the whole authority. Sigebert died in 640, after a short reign of one year; leaving behind him an infant son named *Dagobert*, whom he strongly recommended to the care of Grimoalde his mayor of the palace. The minister caused Dagobert to be immediately proclaimed king, but did not long suffer him to enjoy that honour. He had not the cruelty, however, to put him to death; but sent him to a monastery in one of the Western Islands of Scotland; and then, giving out that he was dead, advanced his own son Childebert to the throne. Childebert was expelled by Clovis king of Burgundy; who placed on the throne Childeric, the second son of Sigebert. Clovis died soon after the revolution, and was succeeded in his dominions by his son Clotaire; who died in a short time, without issue. He was succeeded by his brother Childeric; who, after a short reign, was murdered with his queen, at that time big with child, and an infant son named *Dagobert*; though another, named *Daniel*, had the good luck to escape.

The affairs of the French were now in the most deplorable situation. The princes of the Merovingian race had been for some time entirely deprived of their power by their officers called *mayors of the palace*. In Austrasia the administration had been totally engrossed by Pepin and his son Grimoalde; while Archambaud and Ebroin did the same in Neustria and Burgundy. On the reunion of Neustria and Burgundy to the rest of the French dominions, this minister ruled with such a despotic sway, that the nobility of Austrasia were provoked to a revolt; electing for their dukes two chiefs named *Martin* and *Pepin*. The forces of the confederates, however, were defeated by Ebroin; and Martin having surrendered on a promise of safety, was treacherously put to death. Pepin lost no time in recruiting his shattered forces; but before he had any occasion to try his fortune a second time in the field of battle, the assassination of Ebroin delivered him from all apprehensions from that quarter. After his death Pepin carried every thing before him, overthrew the royal army under the command of the new minister Bertaire; and, having got possession of the capital, caused himself to be declared mayor of the palace; in which station he continued to govern with an absolute sway during the remainder of his life.

Pepin (who had got the surname of *Heristal* from his

20
Miserable
situation of
France.

France. his palace on the Meuse) died in the year 714, having enjoyed unlimited power for 26 years. He appointed his grandson Theudobalde, then only six years of age, to succeed him in his post of mayor of the palace. This happened during the reign of Dagobert already mentioned: but this prince had too much spirit to suffer himself to be deprived of his authority by an infant, the adherents of the young mayor were defeated in battle, and this defeat was soon followed by his death. Charles, however, the illegitimate son of Pepin, was now raised to the dignity of duke by the Austrasians, and by his great qualities seemed every way worthy of that honour. The murder of Dagobert freed him from a powerful opponent: and the young king Chilperic, who after Dagobert's death was brought from a cloyster to the throne, could by no means cope with such an experienced antagonist. On the 19th of March 717, Charles had the good fortune to surprise the royal camp as he passed through the forest of Arden; and soon after a battle ensued, in which the king's forces were entirely defeated. On this Chilperic entered into an alliance with Eudes duke of Aquitaine, whose friendship he purchased by the final cession of all the country which Eudes had seized for himself. Charles, however, having placed on the throne another of the royal family named *Clotaire*, advanced against Chilperic and his associate, whom he entirely defeated near Soissons. After this disaster Eudes, despairing of success, delivered up Chilperic into the hands of his antagonist; after having stipulated for himself the same terms which had been formerly granted him by the captive monarch.

21
Exploits of
Charles
Martel.

Charles now advanced to the summit of power, treated Chilperic with great respect; and, on the death of Clotaire caused him to be proclaimed king of Austrasia: by which, however, his own power was not in the least diminished: and from this time the authority of the kings of France became merely nominal; and so inactive and indolent were they accounted, that historians have bestowed upon them the epithet of *faneans*, i. e. "lazy or idle." Charles, however, had still one competitor to contend with. This was Rainfroy, who had been appointed mayor of the palace; and who made such a vigorous resistance, that Charles was obliged to allow him the peaceable possession of the country of Anjou. No sooner, however, had Charles thus set himself at liberty from domestic enemies, than he was threatened with destruction from foreign nations. The Suevians, Frisons, and Allemanni, were successively encountered and defeated. Eudes also, who had perfidiously broken the treaties to which he had bound himself, was twice repulsed; after which Charles invaded Aquitain, and obliged the treacherous duke to hearken to reason. This was scarce accomplished when he found himself engaged with a more formidable enemy than any he had yet encountered. The Saracens, having over-run great part of Asia, now turned their victorious arms westward, and threatened Europe with total subjection. Spain had already received the yoke; and having passed the Pyrenees, they next invaded France, appearing in vast numbers under the walls of Thoulouse. Here they were encountered and defeated by Eudes; but this proved only a partial check. The barbarians once more passing the Pyrenees, entered France with such a powerful army, that Eudes was no longer able

to resist. He encountered them indeed with his accustomed valour; but being forced to yield to superior power, he solicited the protection and assistance of Charles. On this occasion the latter, on account of his valor and personal strength, acquired the name of *Martel*, i. e. "the hammer," alluding to the violence of the strokes he bestowed on his enemies*. Three hundred and seventy-five thousand of the Infidels, among whom was the commander Abderahman himself, are said to have perished in the battle; notwithstanding which they soon made another irruption: but in this they were attended with no better success, being again defeated by Charles; who by so many victories established his power on the most solid foundation. Having again defeated the Frisons, and with his own hand killed their duke, he assumed the sovereignty of the dominions of Eudes after his decease, reserving to himself the claim of homage, which he ought to have yielded to Thierri his lawful sovereign. At last his fame grew so great that he was chosen by pope Gregory III. for his protector. He offered to shake off the yoke of the Greek emperor, and to invest Charles with the dignity of Roman consul: sending him at the same time the keys of the tomb of St Peter; but while this negotiation was going on successfully, the pope, the emperor, and Charles Martel himself died. After his death, which happened in the year 741, his dominions were divided among his three sons, Carloman, Pepin, and Grippon, according to the disposition he had made in his life-time. By this Carloman, the eldest, had Austrasia; Pepin, the second, Neustria and Burgundy; while Grippon, the third, had only some lands assigned him in France; by which he was so much displeased, that the tranquillity of the empire was soon disturbed. With the assistance of his mother Sonnechilde he seized on the city of Laon, where he endured a violent siege. In the end, however, he was obliged to submit; Sonnechilde was put into a monastery, and Grippon imprisoned in a castle at Arden. The two brothers, having thus freed themselves from their domestic enemy, continued to govern the empire with uninterrupted harmony; but their tranquillity was soon disturbed by the intrigues of Sonnechilde. That enterprising and ambitious woman had negotiated a marriage between Odilon duke of Bavaria and Hiltrude the sister of the two princes. This was no sooner accomplished than Odilon, instigated by Sonnechilde, and alarmed at the growing power of the two princes, entered into an alliance with Theodobald duke of the Allemanni and Theodoric duke of the Saxons; who having assembled a formidable army, advanced directly against the princes. They posted themselves in an advantageous manner, with the river Lech in their front; but Carloman and Pepin, passing the river at different fords in the night-time, attacked the camp of the allies with great vigour. The engagement continued doubtful for five hours: but at last the entrenchments were forced on all sides, the Bavarians and Saxons entirely routed, and the vanquished dukes obliged to submit to the clemency of the victors. During their absence on this expedition, Hunalde, whom Charles Martel had appointed duke of Aquitain, having likewise entered into a confederacy with Odilon passed the Loire, ravaged the open country, and burnt the magnificent cathedral of the city of Chartres. The two princes, however, having returned with their vic-

France.

* See *Ara-*
bia, n° 174.

22
France di-
vided a-
mong
sons of
Charles.

France. terious army, Hunalde found himself obliged to retreat: and even this availed him but little; for the Franks entering the duchy of Aquitain, committed such devastations, that Hunalde in despair resigned his dominions to his son, and retired into a convent. This event was soon followed by a similar resignation of Carloman, notwithstanding the uninterrupted success he had met with. He suddenly took the resolution of retiring into a convent, and persisted in his design, notwithstanding the intreaties of Pepin, who, to appearance at least, did all he could to dissuade him.

23
Pepin becomes sole master of the kingdom.

By the resignation of Carloman, which happened in the year 736, Pepin was left sole master of France; and in this exalted station he acquitted himself in such a manner as has justly rendered his name famous to posterity. One of the first acts of his new administration was to release his brother Grippon from prison: but that treacherous prince had no sooner regained his liberty, than he again excited the Saxons to take up arms. His enterprise, however, proved unsuccessful; the Saxons were defeated, their duke Theodoric taken, and his subjects obliged to submit to the will of the conqueror; who upon this occasion caused them make a profession of the Christian religion. Grippon then fled to Hiltrude, his half-sister, whose husband Odilon was now dead, and had left an infant son named *Tassilon*. He met with a favourable reception from her; but, with his usual treachery, seized both her and her son by the assistance of an army of malcontent Franks, whom he had persuaded to join him. His next step was to assume the sovereignty and title of duke of Bavaria; but being driven from the throne by Pepin, he was obliged to implore his clemency, which was once more granted. All these misfortunes, however, were not yet sufficient to cure Grippon of his turbulence and ambition: He once more endeavoured to excite disturbance in the court of Pepin; but being finally detected and baffled, he was obliged to take refuge in Aquitain.

24
Assumes the title of king.

Pepin having now subdued all his foes both foreign and domestic, began to think of assuming the title of *king*, after having so long enjoyed the regal power. His wishes in this respect were quite agreeable to those of the nation in general. The nobility, however, were bound by an oath of allegiance to Childeric the nominal monarch at that time; and this oath could not be dispensed with but by the authority of the pope. Ambassadors for this purpose were therefore dispatched both from Pepin and the nobility to pope Zachary, the reigning pontiff. His holiness replied, that it was lawful to transfer the regal dignity from hands incapable of maintaining it to those who had so successfully preserved it; and that the nation might unite in the same person the authority and title of *king*. On this the unfortunate Childeric was degraded from his dignity, shaved, and confined in a monastery for life; Pepin assumed the title of *king of France*, and the line of Clovis was finally set aside.

This revolution took place in the year 751. The attention of the new monarch was first claimed by a revolt of the Saxons; but they were soon reduced to subjection and obliged to pay an additional tribute: and during his expedition against them, the king had the satisfaction of getting rid of his restless and treacherous competitor Grippon. This turbulent prince,

having soon become weary of residing at the court of Aquitain, determined to escape from thence, and put himself under the protection of Astolphus king of the Lombards; but he was killed on attempting to force a pass on the confines of Italy. Pepin in the mean time continued to push his good fortune. The submission of the Saxons was soon followed by the reduction of Brittany; and that by the recovery of Narbonne from the infidels. His next exploit was the protection of pope Stephen third, against Astolphus the king of the Lombards, who had seized on the exarchate of Ravenna, and insisted on being acknowledged king of Rome. The pope, unable to contend with such a powerful rival, hastened to cross the Alps and implore the protection of Pepin, who received him with all the respect due to his character. He was lodged in the abbey of St Dennis, and attended by the king in person during a dangerous sickness with which he was seized. On his recovery Stephen solemnly placed the diadem on the head of his benefactor, bestowed the regal unction on his sons Charles and Carloman, and conferred on the three princes the title of *patricians of Rome*. In return for these honours Pepin accompanied the pontiff into Italy at the head of a powerful army. Astolphus, unable to withstand such a powerful antagonist, shut himself up in Pavia, where he was closely besieged by the Franks, and obliged to renounce all pretensions to the sovereignty of Rome, as well as to restore the city and exarchate of Ravenna, and swear to the observance of the treaty. No sooner was Pepin gone, however, than Astolphus broke the treaty he had just ratified with such solemnity. The pope was again reduced to distress, and again applied to Pepin. He now sent him a pompous epistle in the style and character of St Peter himself; which so much inflamed the zeal of Pepin, that he instantly set out for Italy, and compelled Astolphus a second time to submit to his terms: which were now rendered more severe by the imposition of an annual tribute. Pepin next made a tour to Rome; but finding that his presence there gave great uneasiness both to the Greeks and to the pope himself, he thought proper to finish his visit in a short time. Soon after his return Astolphus died, and his dominions were usurped by his general Didier; who however, obtained the papal sanction for what he had done, and was recognised as lawful sovereign of the Lombards in the year 756.

Pepin returned to France in triumph; but the peace of his dominions was soon disturbed by the revolt of the Saxons, who always bore the French yoke with the utmost impatience. Their present attempts, however, proved equally unsuccessful with those they had formerly made; being obliged to submit and purchase their pardon not only by a renewal of their tribute, but by an additional supply of 300 horse. But while the king was absent on this expedition, Vaisar duke of Aquitain took the opportunity of ravaging Burgundy, where he carried his devastations as far as Chalons. Pepin soon returned, and entering the dominions of Vaisar, committed similar devastations, and would probably have reduced the whole territory of Aquitain, had he not been interrupted by the hostile preparations of his nephew Tassilon the duke of Bavaria. The king, however, contented himself at present with securing his frontiers by a chain of posts, against any inva-

France.

France. invasion : after which he resumed his enterprize on the dominions of Vaisar. The latter at first attempted to impede the progress of his antagonist by burning and laying waste the country ; but finding this to no purpose, he determined to try his fortune in an engagement. Victory declared in favour of Pepin ; but he refused to grant a peace upon any terms. The French monarch advanced to the banks of the Garonne ; while Vaisar was abandoned by his ally the duke of Bavaria, and even by his own subjects. In this distress he retired with a band of faithful followers into the country of Saintonge, where he defended himself as long as possible, but was at last deprived both of his crown and life by the victor.

25
Death of
Pepin.

Thus the duchy of Aquitain was once more annexed to the crown of France ; but Pepin had scarce time to indulge himself with a view of his new conquest when he was seized with a slow fever, which put an end to his life in the year 768, the 54th of his age, and 17th of his reign. He was of a short stature, whence he had the surname of *Le Bref*, or *the Short* ; but his great actions justly intitled him to the character of an hero ; though under the succeeding reign his own fame seemed to have been entirely forgot, and on his tomb was only inscribed, " Here lies the father of Charlemagne."

26
Succeeded
by his two
sons.

Pepin was succeeded in his authority by his two sons Charles and Carloman ; to whom with his dying breath he bequeathed his dominions. They continued to reign jointly for sometime ; but the active and enterprising spirit of Charles gave such umbrage to the weak and jealous Carloman, that he regarded him with envy, and was on the point of coming to an open rupture with him, when he himself was taken off by death, and thus the tranquillity of the empire was preserved.

The first military enterprize of Charles was against Hunalde, the old duke of Aquitain ; who leaving the monastery where he had resided upwards of 20 years, assumed the royal title, and was joyfully received by his subjects, already weary of the French yoke. Charles took the field with the utmost expedition, and with difficulty prevailed upon his brother Carloman, who was then alive, to join him with his forces. But the junction was scarce effected, when Carloman withdrew his forces again, and left his brother to carry on the war in the best manner he could. Charles, though thus deserted, did not hesitate at engaging the enemy ; and having overthrown them in a great battle, Hunalde was obliged to fly to the territories of Lupus duke of Gascony. Charles quickly sent an embassy demanding the fugitive prince ; and Lupus, not daring to disobey the orders of such a powerful monarch, yielded up the unfortunate Hunalde, who was instantly cast into prison, from which, however, he afterwards made his escape.

27
Reign of
Charles the
Great.

The death of Carloman, which happened in the year 771, left Charles sole master of France ; but the revolt of the Saxons involved him in a series of wars from which he did not extricate himself for 33 years. These had long been tributaries to the French, but frequently revolted : and now, when freed from the terror of Pepin's arms, thought they had a right to shake off the yoke altogether. Charles entered their country with a powerful army ; and having defeated them in a num-

ber of small engagements, advanced towards Eresbourg near Paderborn, where they had their capital post, and where was the image of their god Irminul, represented as a man completely armed, and standing on a column. The Saxons made an obstinate defence, but were at last obliged to submit ; and Charles employed his army three days in demolishing the monuments of idolatry in this place ; which so much disheartened the whole nation, that for the present they submitted to such terms as he pleased to impose ; and which were rendered easier than they probably would have been, by the news which Charles now received from Italy. He had concluded a marriage with the daughter of Didier king of the Lombards ; but this had been dissolved by the Pope, who reproached the Lombards with the first stain of the leprosy. Thus all friendship was dissolved betwixt Didier and Charles ; and as the Lombard monarchs seem to have had a kind of natural enmity towards the popes, it is not surprising that it should now break out with uncommon fury. Didier having seized and frightened to death Pope Stephen IV. used his utmost endeavours to reduce his successor Adrian I. to a state of entire dependance on himself. Adrian applied to the French monarch, the usual resource of the pontiffs in those days. Charles was very willing to grant the necessary assistance, but the nobility were averse to an Italian war : so that he was obliged to act with great circumspection. Several embassies were therefore sent to Didier, entreating him to restore to the pope those places which he had taken from him, and at last even offering him a large sum of money if he would do so ; but this proposal being rejected, he obtained the consent of his nobility to make war on the Lombards. Didier disposed his troops in such a manner, that the officers of Charles are said to have been unanimously of opinion that it would be impossible to force a passage. This, however, was accomplished, either through the superior skill of Charles, according to some historians, or a panic which seized the Lombard soldiers, according to others ; after which, Didier, with the old duke of Aquitain, who had escaped from his prison, and taken refuge at his court, shut themselves up in Pavia. Adalgise, the only son of the Lombard monarch, with the widow and children of Carloman, fled to Verona. That city was immediately invested by the conqueror, and in a short time obliged to submit. Adalgise had the good luck to escape to Constantinople, but we are not informed what became of Carloman's widow and children. Charles, after paying a short visit to Rome, returned to the siege of Pavia. The place was vigorously defended, until famine and pestilence obliged the inhabitants to implore the clemency of Charles. Hunalde fell a sacrifice to his own obstinacy in opposing the intention of the people ; Didier was taken prisoner and carried into France ; but we are not informed of his fate afterwards. His kingdom, however, was totally dissolved, and Charles was crowned king of Lombardy at Milan in the year 774.

Having received the oaths of allegiance from his new subjects, Charles set out for Saxony, the inhabitants of which had again revolted, and recovered Eresbourg their capital. The king soon recovered this important post ; but a detachment of his army being cut off, and new troubles arising in Italy, he was obliged

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France.

ged to accept of the proposals of the Saxons, though their sincerity was very doubtful. Having therefore only strengthened the fortifications of Erfsbourg, and left a sufficient garrison in the place, he set out for Italy, which was all in commotion through the intrigues of the emperor of the East, and Adalgise the son of Didier. The presence of Charles restored tranquillity in that quarter; but in the mean time, the Saxons having taken Erfsbourg and destroyed the fortifications, threatened to annihilate the French power in that quarter. On the king's return, he found them employed in the siege of Sigebourg. His sudden arrival struck the barbarians with such terror, that they instantly sued for peace; which the king once more granted, but took care to secure their obedience by a chain of forts along the river Lippe, and repairing the fortifications of Erfsbourg. An assembly of the Saxon chiefs was held at Paderborn; and a promise was made, that the nation should embrace the Christian religion: after which the king set out on an expedition to Spain in the year 778.

This new enterprise was undertaken at the request of Ibunala, the Moorish sovereign of Saragossa, who had been driven from his territory. He was restored, however, by the prowess of Charles, who reduced the cities of Pampluna and Saragossa. He reduced also the city of Barcelona, and the kingdoms of Navarre and Arragon; but on his return, he met with a severe check from the Gascons, who attacked and defeated the rear-guard of his army with great slaughter as they passed the Pyrenean mountains. This engagement, which seems to imply some defect in the prudence or military skill of Charles, has been much celebrated among romance writers, on account of the death of Roland a famous warrior.

Next year, 779, he paid a visit to Italy with his two sons Carloman and Louis. Having passed the winter at Pavia, he entered Rome next spring amidst the acclamations of the inhabitants. Here, in the 39th year of his age, he divided his dominions in presence of the pope betwixt his two sons Carloman and Louis. The former, who now took the name of Pepin, had Lombardy; the latter Aquitaine. Having then received the submission of Tassilon duke of Bavaria, he set out for Saxony, where he took a most severe revenge on the people of that country for the many treacheries they had been guilty of. The present revolt was chiefly owing to a chief named Witikind, who had twice before fled from the victorious arms of Charles, and taken refuge at the court of Denmark. Returning from thence in the king's absence, he roused his countrymen to action, while the generals of Charles, disagreeing among themselves, neglected to take the proper methods for repelling the enemy. In consequence of this, they were entirely defeated on the banks of the Weser in the year 782. Charles arrived in time to prevent the total destruction of his people, and directly penetrated into the heart of the country. Witikind, unable to resist his antagonist, once more fled into Denmark; but 4500 of his followers perished at once by the hands of the executioner. An universal insurrection was the consequence of this unheard of cruelty; and though during three years the French monarch was constantly successful in the field, he found it impossible by any force whatever to subdue the

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spirit of the people. At last therefore he was obliged to have recourse to negotiation. Witikind and several other chiefs were invited to an interview; where Charles represented to them in such strong colours the ruin which must necessarily ensue to their country by persisting obstinately in opposition to him, that they were induced not only to persuade their countrymen finally to submit, but to embrace the Christian religion.

Charles having thus brought his affairs in Saxony to an happy conclusion turned his arms against Tassilon duke of Bavaria, who had underhand supported the Saxons in their revolt. Having entered his country with a powerful army in the year 787, he made such rapid advances, that the total destruction of Tassilon seemed inevitable. Charles had advanced as far as the river Lech, when Tassilon privately entered his camp, and threw himself at his feet. The king had compassion on his faithless kinsman on seeing him in this abject posture; but no sooner did the traitor find himself at liberty than he stirred up the Hunns, the Greek emperor, and the fugitive Adalgise, against the king. He fomented also the discontents of the factious nobles of Aquitaine and Lombardy; but his subjects, fearing least these intrigues should involve them in destruction, made a discovery of the whole to Charles. Tassilon, ignorant of this, entered the diet at Ingelheim, not suspecting any danger, but was instantly arrested by order of the French monarch. Being brought to a trial, the proofs of his guilt were so apparent, that he was condemned to lose his head: the punishment, however, was afterwards mitigated to perpetual confinement in a monastery, and the duchy of Bavaria was annexed to the dominions of Charles.

The Hunns and other enemies of the French monarch continued to prosecute their enterprises without regarding the fate of their associate Tassilon. Their attempts, however, only served to enhance the fame of Charles. He defeated the Hunns in Bavaria, and the Greek emperor in Italy; obliging the latter to renounce for ever the fortune of Adalgise. The Hunns, not disheartened by their defeat, continuing to infest the French dominions, Charles entered their country at the head of a formidable army; and having forced their entrenchments, penetrated as far as Raal on the Danube, but was compelled by an epidemic distemper to retire before he had finished his conquest. He was no sooner returned to his own dominions, than he had the mortification to be informed, that his eldest son Pepin had conspired against his sovereignty and life. The plot was discovered by a priest who had accidentally fallen asleep in a church where the conspirators were assembled. Being awakened by their voices, he overheard them consulting on the proper measures for completing their purpose; on which he instantly set out for the palace, and summoned the monarch from his bed to inform him of the guilt of his son. Pepin was seized, but had his life spared, tho' condemned to expiate his offences by spending the remainder of his days in a monastery.

Charles was no sooner freed from this danger than he was again called to arms by a revolt of the Saxons on the one hand, while a formidable invasion of the Moors distressed him on the other; the Hunns at the same time renewing their depredations on his dominions,

France.

nions. The king did not at present make war against the Moors; probably foreseeing that they would be called off by their Christian enemies in Spain. This accordingly happened; the victories of Alonso the Chaste obliged them to leave France; after which Charles marched in person to attack the Saxons and Huns. The former consented again to receive the Christian religion, but were likewise obliged to deliver up a third part of their army to be disposed of at the king's pleasure; but the Huns defended themselves with incredible vigour. Though often defeated, their love of liberty was altogether invincible; so that the war was not terminated but by the death of the king, and an almost total destruction of the people: only one tribe could be induced to acknowledge the authority of the French monarch.

These exploits were finished betwixt the years 793 and 798; after which Charles invaded and subdued the islands of Majorca and Minorca; which the dissensions of the Moorish chiefs gave him an opportunity of doing. The satisfaction he felt from his new conquest, however, was soon damped by the troubles which broke out in Italy. After the death of pope Adrian, his nephew aspired to the papal dignity; but a priest named Leo being preferred, the disappointed candidate determined on revenge. He managed matters so well, that his designs were concealed for four years. At last, on the day of a procession, a furious assault was made on the person of Leo. The unfortunate pontiff was left for dead on the ground; but having with difficulty recovered, and made his escape to the Vatican, he was protected by the duke of Spoleto, at that time general of the French forces. His cause was warmly espoused by Charles, who invited him to his camp at Paderborn in Westphalia; whence he dispatched him with a numerous guard to Rome, promising soon after to visit that metropolis, and redress all grievances. His attention for the present, however, was called by the descents of the Normans on the maritime provinces of his dominions; so that he was obliged to defer the promised assistance for some time longer. Having constructed forts at the mouths of most of the navigable rivers, and further provided for the defence of his territories, by instituting a regular militia, and appointing proper squadrons to cruise against the invaders, he set out for the fourth and last time on a journey to Rome. Here he was received with the highest possible honours. Leo was allowed to clear himself by oath of the crimes laid to his charge by his enemies, while his accusers were sent into exile. On the festival of Christmas, in the year 800, after Charles had made his appearance in the cathedral of St Peter, and assisted devoutly at mass, the pope suddenly put a crown on his head; and the place instantly resounded with acclamations of "Long life to Charles the August, crowned by the hand of God! Long life and victory to the great and pacific emperor of the Romans!" His body was then consecrated and anointed with royal unction; and after being conducted to a throne, he was treated with all the respect usually paid to the ancient Cæsars; from this time also being honoured with the title of *Charlemagne*, or *Charles the Great*. In private conversation, however, he usually protested, that he was ignorant of the pope's intention at this time; and that, had he known it, he would have

28
He is
crowned
emperor of
the west.

disappointed him by his absence: but these protestations were not generally believed; and the care he took to have his new title acknowledged by the eastern emperors, evidently showed how fond he was of it.

Charles, now raised to the supreme dignity in the west, proposed to unite in himself the whole power of the first Roman emperors, by marrying Irene the empress of the east. But in this he was disappointed by the marriage of that princess by Nicephorus: however, the latter acknowledged his new dignity of Augustus, and the boundaries of the two empires were amicably settled. Charles was further gratified by the respect paid him by the great Haroun Al-Rashid, caliph of the Saracens, who yielded to him the sacred city of Jerusalem, and holy sepulchre there. But in the mean time his empire was threatened with the invasion of a very formidable enemy, whom even the power of Charles would have found it hard to resist. These were the Normans, at this time under the government of Godfrey a celebrated warrior, and who by their adventurous spirit, and skill in maritime affairs, threatened all the western coasts of Europe with desolation. From motives of mutual convenience a transitory peace was established, and Charles made use this interval to settle the final distribution of his dominions. Aquitaine and Gascony, with the Spanish march, were assigned to his son Louis; Pepin had Italy confirmed to him; and to this was added the greatest part of Bavaria, with the country now possessed by the Grisons. Charles the eldest had Neustria, Austrasia, and Thuringia. The donation was supposed to be rendered more authentic by the sanction of the pope. This division, however, had scarce taken place, when the princes were all obliged to defend their dominions by force of arms. Louis and Pepin were attacked by the Saracens, and Charles by the Sclavonians. All these enemies were defeated; but while Charles hoped to spend the short remainder of his life in tranquillity, he was once more called forth to martial exertions by the hostile behaviour of Godfrey the Norman leader. Charles sent him a message of defiance, which was returned in the same style by Godfrey: but the former, by artfully fomenting divisions among the northern powers, prevented for a while the threatened danger; but, these disturbances being quelled, the Normans renewed their depredations, and Charles was obliged to face them in the field. An engagement, however, was prevented by the death of Godfrey, who was assassinated by a private soldier; on which the Norman army retreated, and the dominions of the emperor still remained free from these invaders. Still the latter days of Charles were embittered by domestic misfortunes. His favourite daughter Rotrude died, as did also Pepin king of Italy; and these misfortunes were soon followed by the death of his eldest son Charles. The emperor then thought proper to associate his only surviving son Louis with him in the government; which was formally done at Aix-la-Chapelle. Charles himself survived this transaction only a few months: his death happened on the 27th of January 814; in the 71st year of his age, and 47th of his reign.

By the martial achievements of this hero, the French monarchy was raised to its utmost pitch of splendor. He had added the province of Aquitaine to the territories of his ancestors; he had confined the inhabitants

France.

29
Death of
Charles the
Great.

30
Extent of
his territories.

bitants

France.

bitants of Brittany to the shores of the ocean, and obliged them to submit to a disgraceful tribute. He had reduced under his dominion all that part of Spain which extends from the Pyrenees to the river Ebro, and includes the kingdoms of Roussillon, Navarre, Aragon, and Catalonia. He possessed Italy from the Alps to the borders of Calabria; but the duchy of Beneventum, including most of the present kingdom of Naples, escaped the yoke after a transitory submission. Besides these extensive countries, Charles added to his territories the whole of Germany and Pannonia; so that the French now had the jurisdiction of all the country from east to west, from the Ebro in Spain to the Vistula; and from north to south, from the duchy of Beneventum to the river Eyder, the boundary between Germany and the dominions of Denmark. In acquiring these extensive dominions Charles had been guilty of horrid and repeated massacres; for which, however, he had been in some measure excusable by the barbarity and rebellious disposition of the people with whom he had to deal, upon whom no mild measures would probably have had any effect. His establishing of schools throughout the conquered provinces, showed also his inclination to govern his subjects in peace, and to take proper steps for their civilization; though indeed many parts of his private conduct showed no small inclination to cruelty; particularly the fate of the sons of Carloman, of whom no account could ever be obtained. His advice to his son Louis indeed was excellent; exhorting him to consider his people as his children; to be very mild and gentle in his administration, but firm in the execution of justice; to reward merit; promote his nobles gradually; choose ministers deliberately, but not remove them capriciously or without sufficient reason. All these prudent maxims, however, were not sufficient to enable Louis to govern dominions so extensive, and people so turbulent as he had to deal with. At the time of the decease of his father, this prince was about 36 years of age, and had married Ermengarde, daughter of the count of Hefbai of the diocese of Liege, by whom he had three sons, Lothaire, Pepin, and Louis. Lothaire, the eldest, was associated with himself in the empire, and the two youngest were entrusted with the governments of Aquitaine and Bavaria. Every one of the princes proved unfaithful to their father, as well as enemies to one another. The death of Ermengarde, and the marriage of the emperor with Judith a princess of Bavaria, artful but accomplished, proved the first source of calamity to the empire. In the year 823, Charles, the emperor's youngest son was born: and his pretensions became in time more fatal to the public tranquillity than the ambition and disobedience of all the rest. Various parts of the Imperial dominions were likewise assaulted by foreign enemies. The inhabitants of Brittany and Navarre revolted; the Moors invaded Catalonia; while the ambition of Judith produced a war amongst the brothers themselves.

31
Decline of
his empire.

32
Civil wars
among the
sons of
Louis the
Gentle.

Charles at first had been appointed sovereign of that part of Germany bounded by the rivers Danube, the Maine, the Neckar, and the Rhine; the country of the Grisons and Burgundy, comprehending Geneva and the Swiss Cantons: but this was opposed by the three elder sons. Pepin and Louis advanced with the united forces of Aquitaine and Bavaria, while the Im-

perial forces deserted their standard and joined the malcontents. The emperor was taken prisoner, and the empress retired to a monastery. Lothaire, the eldest of the young princes, to whom the rest found themselves obliged to submit, was the person who retained the emperor in his possession; but, notwithstanding his breach of duty, his heart was touched with remorse on account of the crimes he had committed. Dreading the reproach of the world at large, and being threatened with the censures of the church, he threw himself at his father's feet, and begged pardon for his guilt, consenting to relinquish the authority he had unjustly usurped. Thus Louis was re-established in his authority by the diet of the empire which had met to depose him. His first step was to recal his empress from the monastery to which she had retired; but this princess, implacable in her resentment, now persecuted Lothaire to such a degree, that he was obliged to join his two brothers Pepin and Louis in a confederacy against their father. The old emperor thought to check this rebellious disposition by revoking his grant of Aquitaine to Pepin, and conferring it on his youngest son Charles, then only nine years of age; but pope Gregory IV. conferred the Imperial dignity itself on Lothaire, deposing the unhappy monarch, and again sending the empress to a nunnery in the forest of Arden. The unnatural behaviour of his sons, however, once more excited the compassion of his subjects. Dreux, the bishop of Mentz, used his interest with Louis king of Bavaria to arm his subjects in defence of his father and sovereign. In this enterprise the Bavarian monarch was joined by the French and Saxons, so that the aged emperor was once more restored, the empress released from her nunnery, and Charles from his prison, in the year 833.

France.

The ambition of Judith now set matters once more in a flame. Taking advantage of the affection her husband bore her, she persuaded him to invest her son Charles with the sovereignty of Neustria as well as the dominions formerly assigned him. This was productive of great discontents on the part of Lothaire and Pepin; but their power was now too much broken to be able to accomplish any thing by force of arms. The death of Pepin, which happened soon after, produced a new division of the empire. The claims of young Pepin and Charles, sons of the deceased prince, were entirely disregarded, and his French dominions divided between the two brothers Charles and Lothaire, the latter being named guardian to his infant nephew. This enraged Louis of Bavaria, whose interest was entirely neglected in the partition, to such a degree, that he again revolted; but the unexpected appearance, with the hostile preparations of the Saxons, obliged him to submit and ask pardon for his offences. Still, however, the ambition of the empress kept matters in a continual ferment, and the empire was again threatened with all the calamities of civil war; but before these took place, the emperor died, in 831, after a most unfortunate reign of 27 years.

Louis was eminent for the mildness of his manners and peaceful virtues, which procured him the title of *Le Debonnaire*, or "the gentle;" but such was the turbulence and excessive barbarity of the age in which he lived, that all his virtues, instead of procuring him respect



